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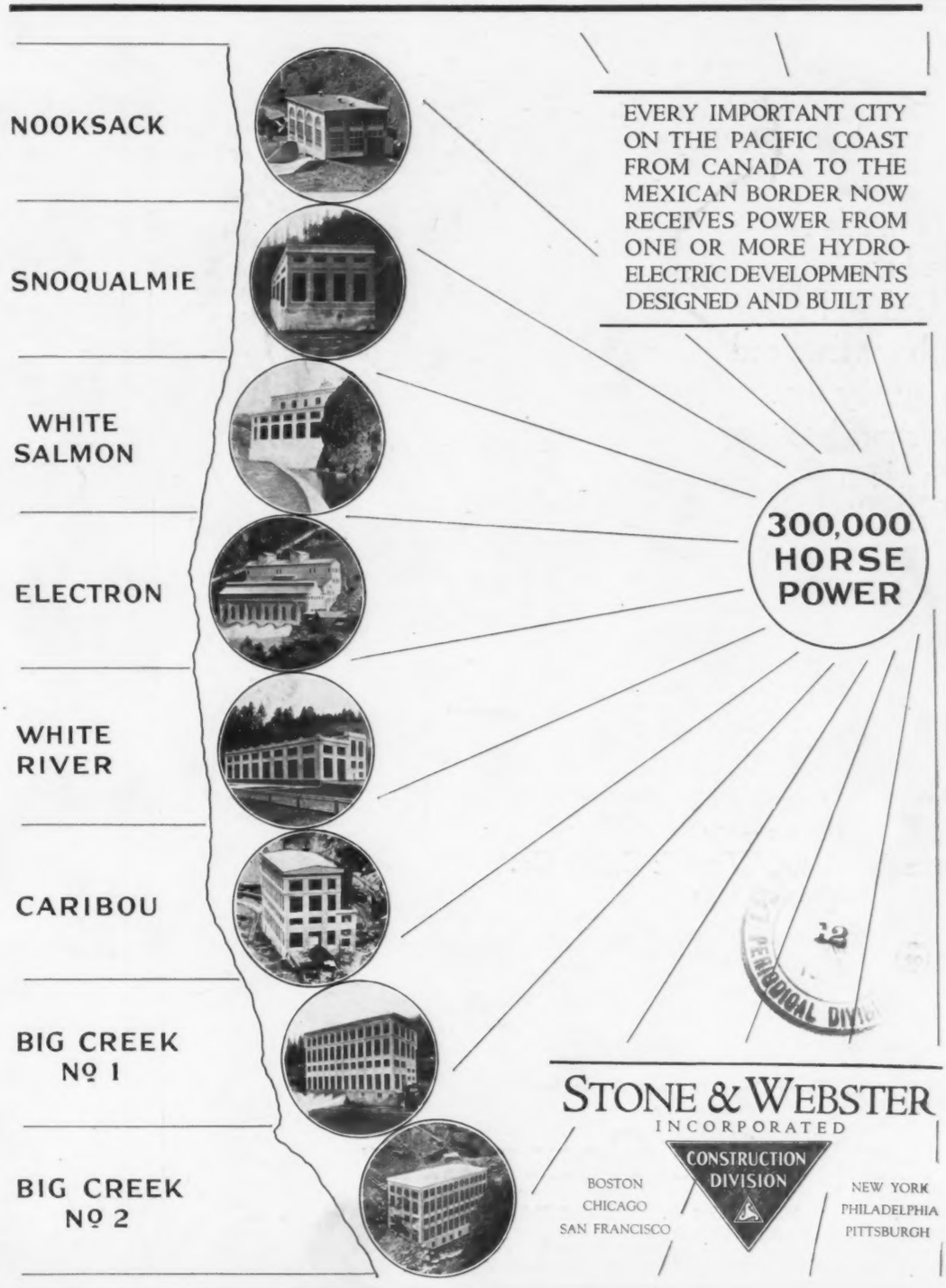

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C. T. HUTCHINSON, Acting Editor

NORMAN S. GALLISON
GEORGE C. TENNEY Associate Editors

ROBERT SIBLEY, Consulting Editor
CLOTILDE GRUNSKY, Contributing Editor

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Westward the Course of Empire Takes Its Way

GOLD was discovered in California in 1848. Climate was discovered some years later. Both have caused many people to emigrate to that state and were generally supposed to be the state's only products. During the past few years many other factors have contributed to turn the eyes of the nation toward the Pacific. Widely diversified agricultural products, large petroleum resources and an abundance of hydroelectric energy are but a few of the things that brought prosperity to California when the remainder of the country was in depression. Today California and the western states are being re-discovered. In agriculture, industry and living conditions, the West is looked upon as the land of opportunity.

WESTERNERS have never been accused of modesty in describing the wonders of their own country. The most irritating of all braggarts is the man who is telling the truth and the nation has seen extravagant statements about the West proved by cold facts and figures. The echo of the laughter that greeted the most enthusiastic booster's dream would hardly die before the prediction would be fulfilled. The ready acceptance of these facts, once they were recognized, has resulted in an astonishing influx of population. This has been particularly true in southern California. There is every indication that the steady growth of the past will continue at an accelerated rate for many years to come.

ONE of the functions of a public utility supplying electric energy is to see that the growth of the territory which it serves is not retarded by lack of power. This means that careful plans must be made for many years ahead, that construction of plants, transmission and distribution lines and substations be so co-ordinated that power will be ready when needed.

CALIFORNIA has been endowed by nature with an abundance of water power capable of being put to beneficial use in the development of electric energy, but this potential power is not easy of access. Mountain ranges must be tunneled, giant reservoirs constructed, railroads built and transmission lines hundreds of miles in length be erected before the energy can be utilized. Obviously this takes time and money as well as engineering skill and daring.

THE Southern California Edison Company furnishes electric energy to a district which has practically doubled in population in the past decade. The demand for electricity has increased much more rapidly and in meeting this demand it is today making history in hydroelectric development. In this issue will be found an account of this company's program in connection with construction activities for the next fifteen years involving the spending of three hundred millions of dollars to develop one million four hundred thousand horsepower of electrical energy. An army of four thousand workers is engaged in bringing this about.

YET this project is but a part of a program of hydroelectric development embracing not only the other utilities of California, but those in every section of the West. The West is alive to its obligations. It is building solidly and carefully and its utilities march in the lead of the caravan of progress.

Much Needed Revision of National Electric Code

THE eyes of the electrical industry have been turned toward New York during March where the National Electric Code has been receiving a much-needed revision at the hands of the electrical committee of the National Fire Protection Association. Following a public hearing conducted by this committee on March 12, at which time criticisms and suggestions of proposed changes were taken up, recommendations for adoption of proposed amendments to the National Electric Code were made. The important modifications are substantially those printed in a bulletin issued well in advance of the public hearing and which has been received with nation-wide interest.

Important among the changes recommended are the abolition of the "660-watt rule" and the permission to increase the branch-fuse limit from 10 to 15 amp., the only limitation of a circuit being a maximum of 12 outlets per circuit. Solid unfused conductors on the grounded sides of branch circuits with a fuse only in the one undergrounded side of the circuit are approved by the new code subject to the permission of the local inspection department.

The new addition to the code which is to be printed during the coming summer, will contain a new arrangement making it easier to understand and refer to.

The National Electric Code, which has been compiled rather haphazardly, has grown to such size and is now of such importance that the electrical industry will welcome this revision not only of important clauses but of its manner of compilation.

Business Barometers Indicate Approaching Period of Inflation

SO RAPID has domestic business expansion become during the first quarter of 1923 that the best previous records are being surpassed in different instances. Demand for the principal raw materials produced in the eleven western states, excepting agricultural products, is equal to or in excess of the available supply, prices of these commodities tending toward higher levels. Increasing distributive activity has accompanied expanding production. In fact, all indications point to a period of inflation comparable with that immediately following the war.

Increased production has caused a shortage of labor in many industries and wages and living costs have risen accordingly. Building activity has not declined during the winter months and undoubtedly will increase during the spring months. A long period of good business and reasonable prosperity may be expected in all related lines provided an increased demand for building materials does not bring on an unwarranted inflation in prices with the inevitable reaction and depression.

It would seem that the era of prosperity which everyone has been looking forward to for the past few years has arrived. The industry should bear in mind the lessons of the past, and that depression follows inflation as day follows night. The foremost economists agree that provided serious disruption does not occur, we can look forward during the next ten years to constantly recurring periods of inflation and depression, each being milder than its predecessor, before economic conditions are stabilized.

The electrical industry of the West in all its varied branches has a particularly bright future before it. This is a growing country whose resources are just beginning to be appreciated by the rest of the country. The industry should set its house in order to meet a situation which promises to test to the utmost its ability to handle an amazing growth in a logical and orderly manner.

Public Opinion Is the Governing Force in Public Utility Affairs

IN THE conduct of a public utility business, public opinion is the great moral force. The time is at hand when public understanding and cooperation between utilities and their customers must be established and maintained. Practically everyone in the communities served finds that electricity is entering into his daily life more and more. The interest of the average consumer in the utility serving him is governed by his attitude toward the service rendered. Enlightenment of consumers is the requirement today upon which depends future success of all public utilities. Consumer cooperation leads to mutual benefits and demands a more direct assumption of responsibility by all concerned.

Advertising is an important feature of the general cooperative plan which will better acquaint customers and prospective customers with utility policy and the products which it has for the convenience and use of the public. The problem is to reach the people so that they may be correctly informed and that public opinion, thus enlightened, may move in the direction of assisting the utility to better perform its tasks. If a utility will do its part in forming favorable public opinion, either through advertising or otherwise, its problems will be more easily solved, and consumer, utility and community will prosper together.

Customer ownership of public utility securities is another method of stimulating a sympathetic understanding of utility matters. Financial and business publications generally, and a large number of national magazines of general circulation, are showing great interest in the growth of the customer ownership of securities movement.

Among the financial publications taking an interest in this is Forbes Magazine, which has offered $1,000 in prizes for the best letter replying to the question: "What are the benefits of Customer Ownership of Public Utilities?" This is an attempt to get the customer-owners' side of the new relationship between producer and consumer.

At a recent dinner in New York, officials of a number of electric light and power concerns, comparing figures and estimates, arrived at a total of $175,000,000 as the aggregate of stocks sold during 1922. And a leading investment bond house estimates total sales of $550,000,000 in bonds—a grand

total of $725,000,000. Customers now own 1,320,000 shares of stock in 84 central station companies which have reported, out of 200 engaged in the sale of securities to customers. One customer out of every 18 now owns stock, and the average purchase is 7 shares per stockholder.

Radio Corporation President Is Optimistic as to Future of Industry

GENERAL JAMES G. HARBORD and David Sarnoff, respectively president, and vice-president and general manager, of the Radio Corporation of America, recently visited the Pacific Coast in the interests of their company. Those who had the pleasure of hearing these gentlemen in public addresses obtained a vivid and optimtistic picture of the future of radio development.

General Harbord, in an interview printed elsewhere in this issue, likens the radio industry of today to the automobile industry of twenty years ago. He predicts a development of equal magnitude. He also says that the average electrical dealer is not equipped and prepared to merchandise radio equipment.

Radio is undoubtedly a subject of prime importance to the electrical dealer. The merchandising, distributing and manufacturing branches of the industry will undoubtedly become stabilized in the immediate future. There is a danger that the music and department stores will dominate the field unless the electrical dealer wakes up to his opportunities.

Map of Interconnected System Has Wide Application

THE revised map of the interconnected hydroelectric systems of the West, published as a supplement to the February 1 issue of the Journal of Electricity and Western Industry, has received favorable commendation from many sources. Requests have been made for copies from hundreds of individuals and organizations. Chambers of Commerce, manufacturers, bond houses, engineers and others are all using it to help tell the story of western growth and progress.

Among the interesting uses to which this map has been put was a window display featured by Strassburger & Company, investment security dealers of San Francisco, in defense of the power companies of California. Radical newspapers in California have been making capital out of statements as to expenditures in connection with the campaign to defeat the late unlamented Water and Power Act in that state. Under the caption "Faithful Stewards" the following text appeared:

"The accompanying map should give pause to those who have been turning up the whites of their eyes in holy horror at the news concerning the sums disbursed by the Public Utility Companies in order to protect the property of their shareholders—mostly men and women of moderate means—from politicians out for loot.

"The map shows what has been accomplished by men of ability and large vision, with the help of the savings of the common people. Work that has placed California on record as the most enterprising state in the Union, that has spread her fame throughout the world.

"If a burglar announces his intention to pay you a night visit with an empty sack, and you know also that he proposes to depart with a full one, is it to be regarded as a crime to buy a gun and use it? If the property which he proposes to take away is not your own but is held in trust for others, the purchase of the gun would seem not only not criminal, but an obvious duty.

"The managements of the Public Utility Companies of California have spent a small portion of the surplus funds saved by them (as a wise precaution) out of what you have invested in the properties shown here—against a rainy day. The rainy day came in the form of a raid on your property, and they used a portion of these funds to protect your much larger interests.

"That is all, and they are entitled to our thanks."

Engineers, Scientists, and Editors Plan to Standardize Symbols and Abbreviations

A RECENT conference held in New York City under the auspices of the American Engineering Standards Committee revealed a sentiment among engineers, scientists, government officials, business paper editors, and industrial executives, emphatically in favor of the unification of technical and scientific abbreviatons and symbols.

It was agreed on all sides that the standardization of abbreviations and symbols would result in inestimable mental economies. The present situation with respect to the use of abbreviations and symbols in engineering, scientific, and other technical fields is comparable to a language which has degenerated into a multiplicity of dialects each of which has to be translated for the users of the others. Abbreviations and symbols constitute an ever growing and important part of the language of engineers, scientists, industrial editors, and other technical men.

The conference was called upon requests from the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the Association of Edison Illuminating Companies, to consider abbreviations and symbols, but after some discussion of the subject it was thought desirable to include as a part of the project, the graphical symbols which are used in engineering drawings, diagrams, and the like, for representing instruments and apparatus and components of them.

It was agreed that the cooperation of foreign standardizing bodies should be sought, in the development of the work. The importance of international uniformity in symbols is great on account of the international character of much engineering and scientific work, and the importance of reference books and periodicals in foreign languages.

The work will go forward under a committee organization developed in accordance with the rules and procedure of the American Engineering Standards Committee.

CURRENT COMMENT

The failure of the Arizona State Legislature to ratify the Colorado River pact before adjournment has resulted in a political tangle which threatens to nullify the efforts expended by Secretary Hoover and the Colorado River Commission in framing a treaty which would prove satisfactory to the seven states who are concerned with the distribution of the waters of that stream. Seemingly, development of the river for flood control, irrigation and power purposes is still a dream of the far distant future.

Colorado River Pact Threatened By Politics

Of chief importance among the developments resulting from delayed action on the treaty is the statement from the Federal Power Commission that applications on file for projects on the river will be held in abeyance until the pact meets with approval from all of the states and from Congress. Numerous applications are on file at the present time and during the past fortnight two additional ones have been placed before the commission for projects at Boulder Canyon.

In Arizona itself the political pot has been upset with a vengeance. Governor W. P. Hunt has announced that the office of State Water Commissioner will be vacant after March 31, 1923. This office is held by W. S. Norviel, who was a member of the Colorado River Commission and one of the framers of the pact. In his letter, Governor Hunt has declared that Commissioner Norviel is being ousted because he did not take proper steps in securing data on the Colorado River previous to the negotiation of the compact. In political circles of the state it is rumored that the action of the governor is the result of party politics.

The League of the Southwest, whose membership consists of 3,000 organizations in the seven Pacific Southwest states, has also taken a hand in the situation. Through Arnold Kruckman, secretary-treasurer of the league, invitations have been issued to the governors of these states to attend a meeting in Santa Barbara, Calif., May 18 and 19, to discuss the formulation of a new pact. In his telegrams to the various governors, Mr. Kruckman says:

"The conference is called at the request of units in the northern states, as well as in the south, to discover whether comprehensive discussion may reveal a broad basis upon which another Colorado River pact may be formulated, in place of the Hoover treaty, killed in Arizona. Cabinet officers, congressional delegations and distinguished representatives of great interests involved will participate, and attendance will be heavy in numbers, substance and influence.

"We are making an effort to secure full, fair and exhaustive discussion, such as is necessary to formulate a treaty unanimously agreeable, and we will deeply appreciate your interested cooperation."

The proposed meeting has not met with unanimous support, as is indicated in the replies of Governor Richardson of California and Governor Scrugham of Nevada. The California governor in declining to take part in the conference has said:

"Fail to understand your authority in calling conference and do not understand Arizona has nullified Colorado pact."

Governor Scrugham has also declined to participate in the meeting. His reply to Mr. Kruckman follows:

"Replying to your wire of March 10, 1923, we do not concede or understand that the Colorado pact has been nullified by the failure of the Arizona Legislature to ratify.

"You have neither the standing nor the authority to make or initiate any kind of a pact, and I am at a loss to understand your connection with the problem.

"There will be no official representation at your meeting from this state."

There has been some hope that Governor Hunt of Arizona would call a special session of the State Legislature for consideration of the pact. It seems certain that Arizona will demand a clause in the treaty which will give that state a right to tax all power produced from developments on the Colorado River within the state.

That electricity is a potent factor in fire prevention and that it has reduced the number of fires in Denver by more than 95 per cent in the last five years on account of its application in the household and industrial world, is the declaration made by the chief of the Denver fire department in the newspapers of that city as a result of a survey made by his department at the behest of the Electrical Co-operative League. In his statements, the chief of the fire department said:

Electricity to Blame For Few Fires in Denver

"The increasing demand for electricity for heat, light and power purposes in place of steam, gas and coal has curtailed the number of fires at least 95 per cent and perhaps an even higher figure. In short, not more than one fire in 1,000 is caused by electricity when used properly."

He grouped the few fires of electrical origin which have occurred in the following three general classes: fires over which ordinary precautions exert little control, such as conflagrations due to interferences with transmission lines by falling trees, lightning, storms and static electricity; fires caused by abuse and carelessness in the use of electric appliances, and lastly, tampering with fuses, deterioration of installations and defective equipment.

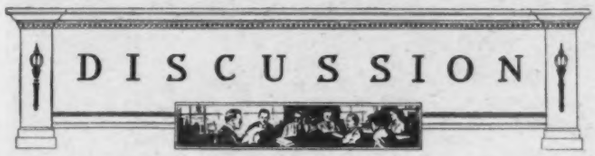
Twenty-four conflagrations occurring in Denver during the course of two years which were blamed to electricity, have been proved by the department to have resulted from other causes entirely. The statement issued by the chief of the department continues:

"Results of our investigations convince us that it is not the use of electricity that causes the fires, but rather its misuse. Electricity, when properly applied, is one of the most effective agencies in minimizing the fire liability, although many careless persons are inclined to blame their fire losses to electricity without making an investigation."

It is pleasing to note the steps which are being taken in the various localities to overcome the popular tendency to blame electricity for fires in which the cause cannot be readily ascertained. The Denver Electrical Cooperative League deserves commendation for the steps which it has taken to secure the cooperation of the local chief of the fire department to dispel this myth.

1923 Program of Cleveland League Involves $60,000

In planning its activities for 1923, The Electrical League of Cleveland has divided the industry into four natural groups or sections, somewhat similar to the organization of the Joint Committee for Business Development. These groups are the wiring section, lighting section, appliance section, and industrial power and heating section. The wiring section plans among its activities to distribute booklets of wiring suggestions to all who take out permits for dwelling buildings, and encourage home builders to bring their plans to the league for expert advice on wiring and lighting the home. Contact will be maintained with architects, building contractors and wiring contractors, and the section will work in cooperation with the lighting section for the betterment of lighting conditions in new and already-built structures.



Takes Issue with Communication on Subject of Heating Homes by Electricity

To the Editor:

Sir: I have read with interest in your issue of Jan. 15, 1923, the following:

1. A communication on page 47, from A. C. McMicken of the Portland Railway Light & Power Company, that commends an article signed by S. H. Graf, of Corvallis, Ore., in which the latter claims it is impracticable to use electricity for heating purposes, because of its being too expensive to do so, etc.

2. Your reply on page 42, in which you treat the matter dispassionately and point out that: "Electric heating should not be unwisely discouraged."

The modern practice of railroads and other transportation lines, of giving a rate of freight on certain commodities that is lower than is charged for other articles, is well established as being both desirable and necessary, and a vast part of the business of the country is handled upon this basis, which leads many people to feel that the sale of electric energy ought to be governed by a policy as to different rates, which will encourage and justify its general use for heating and cooking, as well as for power and light.

In my opinion, the people desire an opportunity to use electric energy for supplying heat in a more general way than is done now, therefore, privately owned utility corporations such as the Portland Railway, Light & Power Company, are but arousing in the mind of the public a demand for electric plants which are public owned, when the said privately owned utility corporations fail to render a service in this respect which the public feels is based on fair rates.

Tacoma, Wash., has been foremost in granting low rates for heating purposes and, as it is an axiom that a city which cannot do business as cheaply as any other city will be surpassed by its rivals, may this not be applied to hydroelectric plants, whether they be privately owned, or publicly owned?

The aforesaid communication which bears the signature of Mr. Graf, presents with clearness the point of view of some of the privately owned utility corporations upon the subject that is discussed therein, and, while it may be true that he is not employed by the utility corporation with which Mr. McMicken is associated, it is nevertheless a fact that the former devotes a considerable part of his time each year to the service of the Portland Gas Company, a subsidiary of the Pacific Power & Light Company, which also owns and operates several electric plants in the Northwest, hence to those who are aware of this, it is surprising to read in the above mentioned communication from Mr. McMicken that:

"To my mind, the answer is a fitting one, coming as it does unsolicited and from a man (Mr. Graf) not in the employ of an electrical utility company."

Portland, Ore., March 3, 1923. W. F. BURRELL.

Error as to Date Is Noted in Recent Editorial on Carrier Current Demonstration

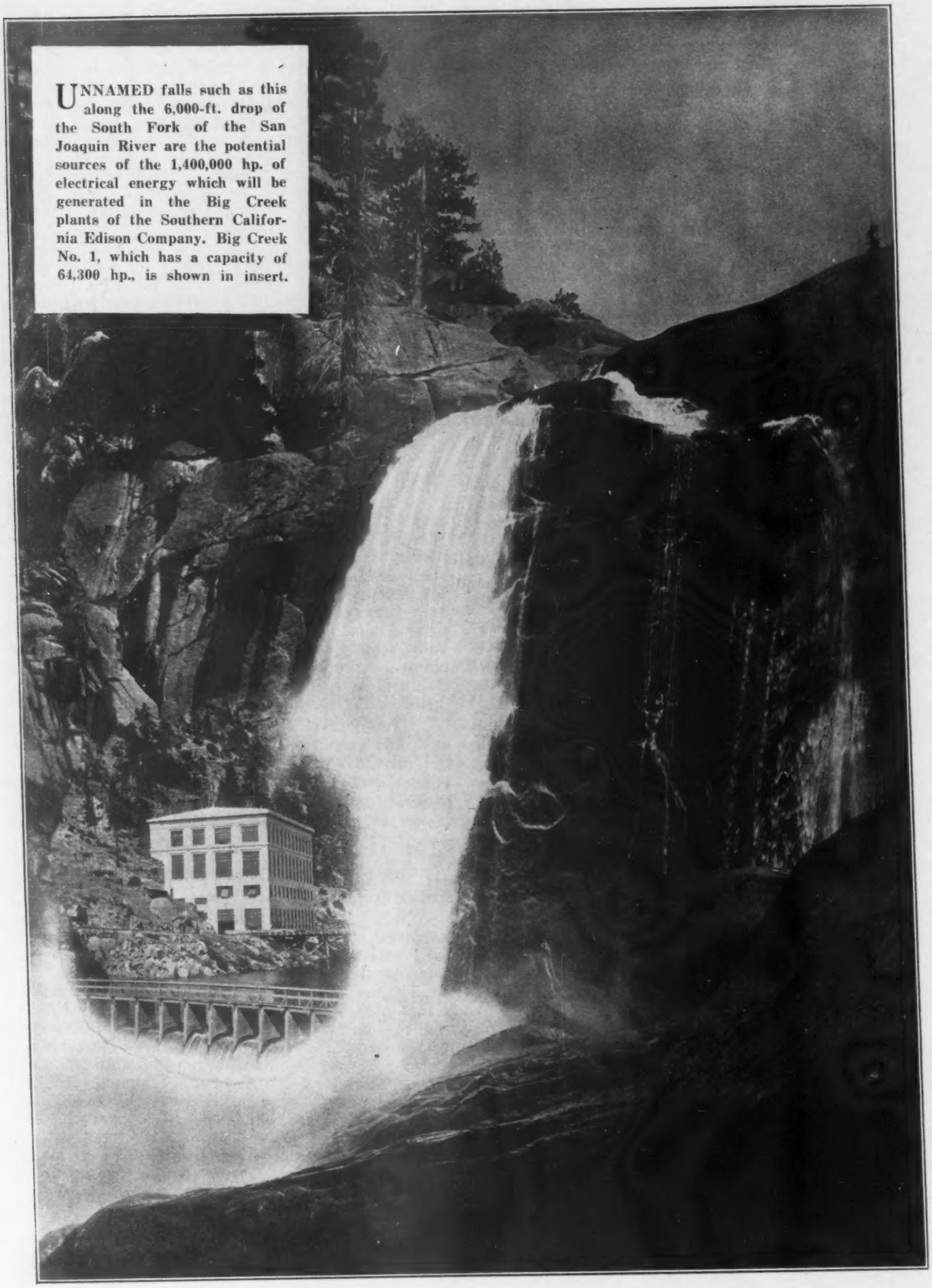
To the Editor:

Sir: I read with much interest the editorial in the March 1, 1923, issue of "Journal of Electricity and Western Industry," captioned: 'Carrier Current Demonstration of Interest to Power Companies.'

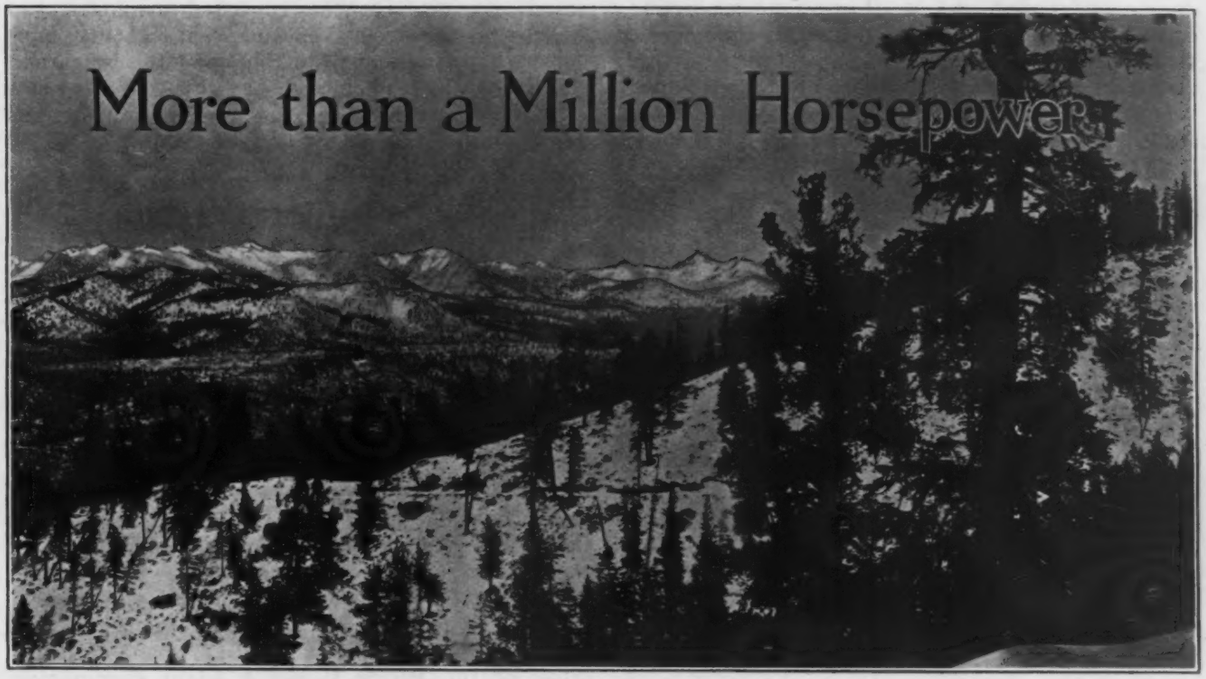
The last paragraph of your editorial is in error, in that automatic switching was accomplished on a ship, equipped by the Radio Corporation of America and the General Electric Company, more than a year ago when conversation was carried on automatically between officials of the American Telephone & Telegraph Company, Radio Corporation of America and the United States Shipping Board, located in New York City and Connecticut, through the transmitting and receiving stations of the American Telephone & Telegraph Company, located on the New Jersey Coast.

ARTHUR A. ISBELL,
General Superintendent,
Pacific Division,
Radio Corp. of America.

San Francisco, Calif., March 7, 1923.



UNNAMED falls such as this along the 6,000-ft. drop of the South Fork of the San Joaquin River are the potential sources of the 1,400,000 hp. of electrical energy which will be generated in the Big Creek plants of the Southern California Edison Company. Big Creek No. 1, which has a capacity of 64,300 hp., is shown in insert.



By George C. Tenney

IN its Big Creek-San Joaquin River hydroelectric project where approximately $300,000,000 is being spent to produce and market 1,400,000 hp. of electrical energy, the Southern California Edison Company is keeping abreast of the ever increasing power demands of the rapidly growing territory to which its service extends.

GROWTH and expansion of California is closely linked with the ability of the large public utility companies to construct additional generating stations to meet the ever-increasing power demands of the state. Community life and community development, insofar as power is a part of their requirements, are based upon an adequate and dependable supply of electrical energy. Thus it is that the electric power systems have become the great community engines. Imagine, if you will, such an engine, which during 1923 will be capable of generating 500,000 hp., to which there is being added unit after unit to keep up with the rapidly growing power demands of the territory which it serves. Such a community engine is the Southern California Edison Company, engaged at the present time on a development program embracing 1,400,000 hp. to be generated from the waters of Big Creek and the San Joaquin River,—a project involving the expenditure of approximately $300,000,000 over a period of fifteen years.

Serving as it does a territory equal to the entire area of the states of Vermont, New Hampshire, Connecticut, Rhode Island, New Jersey, and Delaware, the Southern California Edison Company produces 80 per cent of the power used in Los Angeles and the contiguous territory and must be depended upon to supply 85 per cent of the hydroelectric power yet to be developed within the state for use in the southern half. This company's growth, the use to which the power is put, together with its extensive plans for future development, are typical of the expansion and growth of southern California itself, for there, as perhaps in no other section of the country, population and industry have grown coincidentally with the science of generating and transmitting electric power. For example, during the past two decades the population of the territory served by the Southern California Edison Company has increased over 300 per cent while the company has increased its generating capacity from 12,000 hp. in 1900 to 500,000 hp. in 1923. However, the real story of development of the company goes back another decade.

In fixing the date of its historical beginning, the Southern California Edison Company may be said to have originated with the Redlands Electric Light & Power Company in 1892. This company, with its small hydroelectric plant on Mill Creek, was the first in the world to transmit hydroelectric energy from the point of generation to the load center at a voltage higher than that at which the energy was generated. It has always been considered, however, that the company started in 1895 with the formation of the West Side Lighting Company of Los Angeles, whose first plant consisted of an 80-hp.

engine and boiler and a thirty-light arc-lighting dynamo. The total connected load in December of that year was five commercial arc lights and three street arcs. The early development of the company was fraught with difficulties. Unable to secure a franchise from the City of Los Angeles, the company installed poles on private property and began serving consumers inside the city limits. Discovering an old franchise which had been granted many years before and which had never been used, the company officials immediately purchased it, only to find that their troubles had just begun. Under the terms of this franchise they were to furnish lighting to the city hall and they had but two weeks to comply with these terms. By almost superhuman efforts on the part of all their men, wires were strung on the poles of the street railway company, and by bridging the last gap of a block with wires strung on a "horse" set on the roof of a building, a light was burning in the city tower twelve hours before the franchise would have become null and void.

From that time on, the growth of the company and the territory it served went forward by leaps and bounds. By a series of consolidations, the properties of the Southern California Power Company were taken over in 1898, bringing the Mill Creek and Santa Ana River plants into the system. In 1902, the Edison Electric Company was organized with a capitalization of $10,000,000. In the same year Lytle Creek and the Kern River systems were acquired. By 1907 the several hydroelectric plants taken over from the various companies had been completed, including Kern River No. 1 with its generating capacity of 20,000 kw. In 1909 the present company was incorporated. The program of consolimajor uses to which this electrical energy was being applied, namely: lighting, agriculture, railroads and manufacturing. Lighting consisted of municipal as well as private arc and incandescent lighting; agriculture consisted chiefly of pumping for irrigation; railroads were requiring additional power to operate city and interurban lines, and manufacturing had grown until 4,200 plants, representing a total of eighty industries, had been established in southern California. An idea of the relative magnitude of the different classes of business can be gained from a glance at the connected load for each class, which is indicated in Table II. This total connected load dation reached its climax in 1917 when the properties of the Pacific Power & Light Corporation, including the famous Big Creek plants, were acquired. Table No. I shows the chronological growth of the company's generating plants.

Back of this rapid expansion and development were the ever increasing demands of a rapidly growing population for more power. There were four major uses to which this electrical energy was being applied, namely: lighting, agriculture, railroads and manufacturing. Lighting consisted of municipal as well as private arc and incandescent lighting; agriculture consisted chiefly of pumping for irrigation; railroads were requiring additional power to operate city and interurban lines, and manufacturing had grown until 4,200 plants, representing a total of eighty industries, had been established in southern California. An idea of the relative magnitude of the different classes of business can be gained from a glance at the connected load for each class, which is indicated in Table II. This total connected load dation reached its climax in 1917 when the properties of the Pacific Power & Light Corporation, including the famous Big Creek plants, were acquired. Table No. I shows the chronological growth of the company's generating plants.

Back of this rapid expansion and development were the ever increasing demands of a rapidly growing population for more power. There were four of 706,308 hp., on account of its diversity of character, is served by a maximum system demand of only 320,000 hp. This is made possible by the diversified requirements of agricultural, industrial and domestic service and the extent and varied character of the territory served.

Table I—Capacity of Present Power Houses and Date When Placed in Operation.

Power House	Placed in Operation Year	Initial No. of Units	Installation Hp.	Present No. of Units	Installation Hp.
Mill Creek No. 1	1893	3	1,000	3	1,000
Azusa	1898	5	2,000	5	2,000
Santa Ana No. 1	1898	4	4,000	4	4,000
Kaweah No. 1	1899	3	1,800	3	1,800
Mill Creek No. 2	1899	2	600	1	300
St. Barbara Steam	1900	1	400	0	0
Sierra	1901	2	800	2	800
St. Barbara Steam	1901	1	400	0	0
Mill Creek No. 3	1903	4	4,000	4	4,000
Santa Ana No. 3	1904	1	2,000	1	2,000
Lytle Creek	1904	2	700	2	700
Borel	1904	5	13,400	5	13,400
Kaweah No. 2	1905	3	2,000	2	2,300
Santa Ana No. 2	1905	2	1,300	2	1,300
Visalia Steam	1906	1	1,300	..	.....
Kern River No. 1	1907	4	26,800	4	26,800
Redondo Steam	1907	3	20,000	0	0
St. Barbara Steam	1909	1	400	0	0
Tule River	1909	2	2,700	2	2,700
Redondo Steam	1910	1	16,800	0	0
Redondo Steam	1911	1	16,800	5	53,600
Long Beach Steam	1911	1	16,800	0	0
Visalia Steam	1912	1	1,000	0	0
Long Beach Steam	1913	1	20,000	0	0
Kaweah No. 3	1913	2	3,800	2	3,800
St. Barbara Steam	1913	1	1,300	3	2,500
Big Creek No. 1	1913	2	42,900	2	42,900
Big Creek No. 2	1913	2	42,900	0	0
Long Beach Steam	1914	1	26,200	3	63,000
Visalia Steam	1914	1	5,400	3	7,700
Fontana	1917	2	2,400	2	2,400
Big Creek No. 2	1921	1	21,400	3	64,300
Kern River No. 3	1921	2	42,900	2	42,900
Big Creek No. 8	1921	1	30,200	1	30,200
Total—Present Installation				67	376,400

TABLE II—Connected Load in Horsepower Jan. 1, 1922

	Hp.
Lighting	172,540
Pumping Plants for Irrigation	154,532
Cement Mills and Rock Crushing	21,035
Railway	109,881
Municipalities for Resale	76,984
Municipalities for Pumping, Sewers, etc	12,413
Ice Making and Refrigeration	5,055
Motion Picture Industry	4,014
Electric Cooking	27,115
Oil Well Development and Operation	9,029
Industrial and Miscellaneous	110,710
Total	706,308

Table III—Miles of Wire Comprising Edison System

TRANSMISSION LINES AS OF DEC. 31, 1922

482 miles of 150,000-Volt Transmission Lines
1,267 miles of 60,000-Volt Transmission Lines
198 miles of 30,000-Volt Transmission Lines

Total 1,947 miles of 3-wire Transmission Lines
or 5,841 miles of single-wire Transmission Lines

DISTRIBUTION LINES AS OF DEC. 31, 1922

9,110 miles of primary wire
5,343 miles of secondary wire
1,483 miles of street light wire
28 miles of underground cable

Total 15,964 miles of distribution wire

Table IV—Growth in Number of Meters

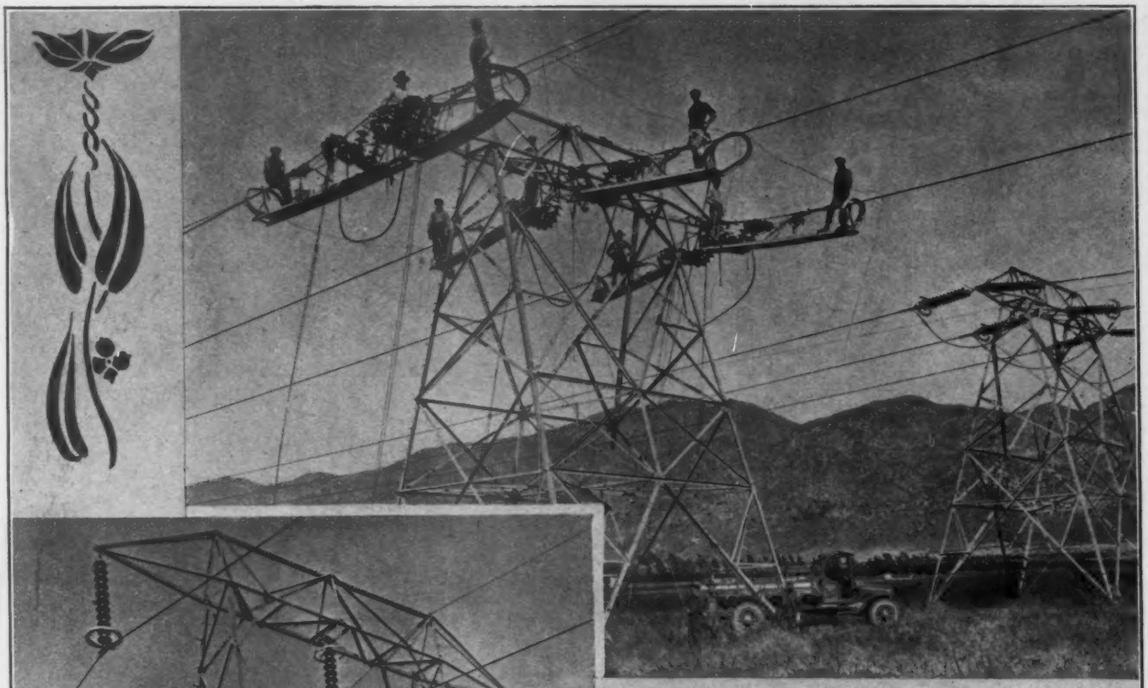
Year	Number of Meters
1909	44,445
1910	55,338
1911	66,398
1912	80,995
1913	96,851
1914	108,439
1915	116,768
1916	124,019
1917	.....
1918	201,129
1919	214,528
1920	238,269
1921	302,659
1922	318,795

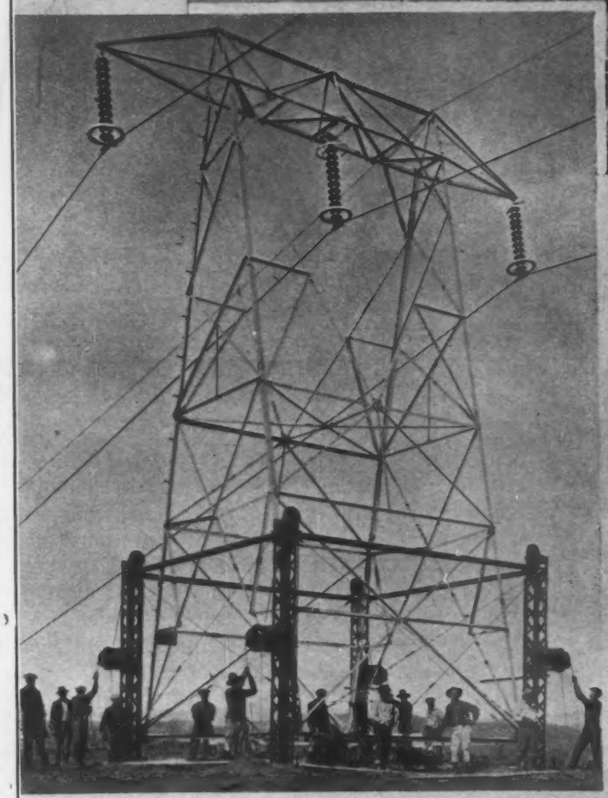
Map showing the section of southern California served by the Southern California Edison Company, whose network of wires is almost sufficient to encircle the globe once.

Coincident with this growth in load and generating capacity, there has been an expansion of transmission and distribution lines until the Southern California Edison Company is now distributing its power in the ten counties of Los Angeles, Orange, Riverside, San Bernardino, Ventura, Kern, Tulare, Kings and Fresno, with a total population of 1,500,000. From Redlands on the east to Santa Barbara on the west, the territory served extends 150 miles, while the distance from Visalia on the north to Capistrano on the south, is 210 miles. The City of Los Angeles, in addition to being served by the Southern California Edison Company on a wholesale basis, is also partially served by the Los Angeles Gas & Electric Company and the Bureau of Power and Light of the city. The extent of the territory served is shown on the accompanying map while the network of wire covering it, almost long enough to reach around the world once, is shown in Table III. Growth in the number of meters installed on the system is shown in Table IV.

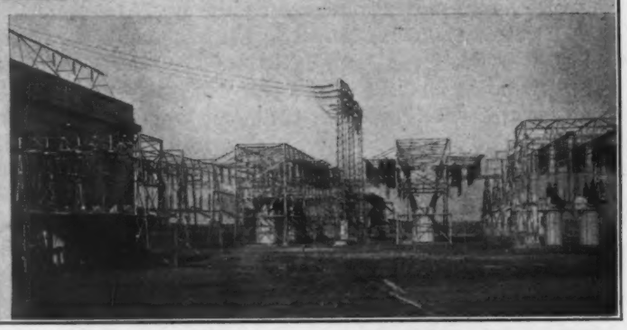
This territory, as has been shown, is growing rapidly and expanding both agriculturally and industrially. Although the Southern California Edison Company supplies power for the irrigation of 550,000 acres of land at the present time, there yet remains in the territory served, over a million acres capable of being irrigated by electrically pumped water, representing a potential connected load of 250,000 hp. Three hundred kilowatt-hours of electrical energy used yearly in the irrigation of one acre of land increases its sale value from $30 to $225 an acre and yields an annual return of from $50 to $100 in crops. Consideration of this fact leads to the conclusion that the use of electric power for irrigation requirements will expand until every available acre for which there is water will be brought under cultivation.

Modern standards demand electric service for farm, home and factory. Domestic consumption, which depends upon population, will increase rapidly so long as new appliances continue to make electricity more and more of a necessity in the home. The electrification of certain railroads in southern California is bound to occur when the consumption of fuel oil overtakes the supply. An abundance of raw materials, an expanding and easily accessible market, and adequate transportation facilities are positive assurance of future industrial growth. Electricity is, therefore, the motive power upon which California industries depend,—agriculture, manufacturing and transportation cannot go forward without an adequate supply of electric power. As these industries expand and grow, so does the demand for power increase.

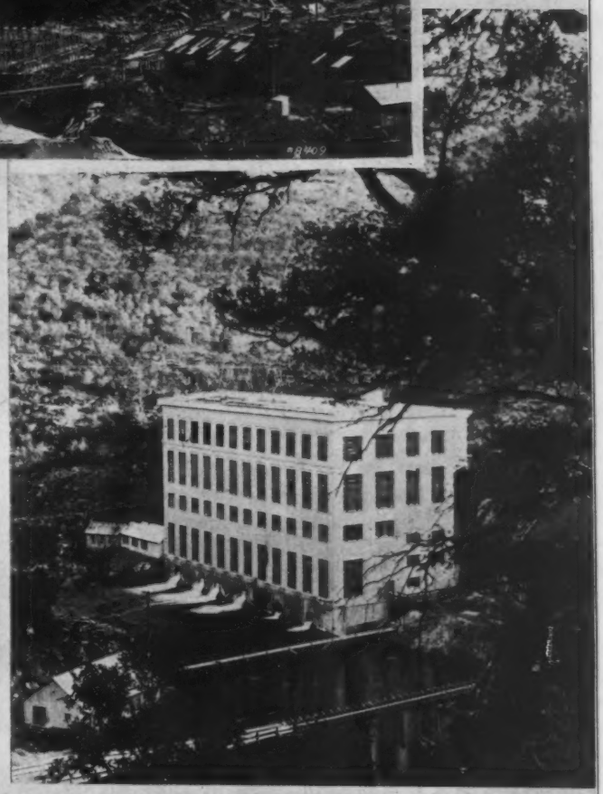




TRANSMISSION of electrical energy over long distances from generating plant to load center has necessitated the use of exceedingly high voltages. The Southern California Edison Company will be the first utility in the world to employ 220,000-volt transmission. The picture above shows a line crew changing the insulators on the Big Creek line for 220,000-volt operation while on the left a crew is preparing to place a 13-ft. extension on one of the towers. Below on the left is a view of one of the distribution substations outside of Los Angeles while on the right is shown the 60,000-volt bus structure at the Vestal substation.



DURING 1923 the Southern California Edison Company will add approximately 120,000 hp. to its generating capacity. Big Creek No. 3 on the main San Joaquin River will be the largest plant on the system. A view of the site of the plant showing the penstock grade and some of the construction activity is shown above. The plant will closely resemble Big Creek No. 2, a view of which is shown on the right. At the end of the present year a total of 258,800 hp. will be represented in the four plants. A view of the interior of Big Creek No. 2 is shown below on the left, while the outlet of one of the many tunnels is shown on the right.



Based upon past consumption of electric energy (Table V) it appears that the rate has been an annually compounded increase of approximately ten per cent. With a continuation of this rate of growth, estimates of the Southern California Edison load have been prepared up to 1928 showing that at that time the connected load served will be 1,500,000 hp.

TABLE V—Uses to which Electrical Energy Is Being Applied and Their Growth During the Period 1910-1922 in Kilowatt Hours

Year	Lighting	Agricultural	Railroads	Cement Mills	Industrial and Miscellaneous	Total Sold	% Increase
1910	37,300,000	73,300,000	189,700,000	.....	27,700,000	328,000,000	....
1911	44,100,000	72,000,000	207,600,000	8,900,000	31,200,000	363,800,000	10.5
1912	50,900,000	90,500,000	217,400,000	37,200,000	35,500,000	431,500,000	18.9
1913	59,100,000	111,000,000	236,700,000	42,800,000	41,300,000	490,900,000	13.9
1914	68,200,000	102,000,000	239,200,000	37,700,000	47,800,000	494,900,000	1.0
1915	74,400,000	107,000,000	248,600,000	30,400,000	53,300,000	513,700,000	3.9
1916	88,500,000	110,000,000	247,800,000	29,600,000	61,000,000	536,900,000	4.2
1917	52,700,000	129,000,000	262,300,000	36,900,000	130,200,000	611,100,000	14.0
1918	34,800,000	150,000,000	270,600,000	31,700,000	203,100,000	690,200,000	13.0
1919	39,700,000	162,000,000	254,300,000	28,000,000	275,200,000	759,200,000	9.8
1920	49,300,000	168,000,000	278,400,000	54,700,000	242,300,000	792,700,000	14.6
1921	57,600,000	176,600,000	272,200,000	54,400,000	287,000,000	847,800,000	7.0
1922	72,000,000	159,900,000	283,400,000	64,300,000	322,300,000	901,900,000	6.5

NOTE: In 1917 the Lighting load went down, while the Industrial and Miscellaneous power load went up. This was due to the operating agreement entered into between the Edison Company and the City of Los Angeles, whereby the load sold by the company for use on the Los Angeles distribution system was put on a wholesale basis and therefore not classified as to ultimate use.

It is upon this analysis of past growth and future needs that the Southern California Edison Company has based its program for development on Big Creek and the San Joaquin River,—a program involving a budget of $150,000,000 for the seven years, 1922-1928, inclusive. Of this sum, approximately $24,000,000 was spent during the past year and the remainder will be spread over the next six years, as follows:

1923	$26,000,000
1924	14,000,000
1925	23,000,000
1926	20,000,000
1927	20,000,000
1928	23,000,000

In order to meet the future demand, a comprehensive survey of the potential power available in the high Sierra within economical transmission distance of the southern California load centers was made several years ago. It was found that there was available for development on the San Joaquin River and its tributaries, 1,400,000 hp., on Kern River, 80,000 hp., and on the Kaweah River, 21,000 hp. Kaweah River has been developed to its ultimate capacity, while 69,700 hp. has been developed on Kern River. Two plants on Big Creek Nos. 1 and 2, were completed in 1913, bringing in a total of 85,800 hp. Big Creek No. 8 was completed in 1921 giving an additional block of power of 30,200 hp. and a third unit has been added to Big Creek No. 2, increasing its capacity to 64,300 hp. During 1923 a total of 122,000 hp. is being developed, 100,000 hp. in Big Creek No. 3 and 22,000 hp. in No. 1. A comprehensive idea of the operating plants of the company, both steam and hydroelectric, can be gained from Table VI.

This early development involved the construction of a huge storage reservoir, Huntington Lake, since all of the Big Creek-San Joaquin plants will be operated with storage, against the Kern River, Kaweah River and other smaller plants which are operated from stream flow alone. This reservoir has a capacity of 88,000 acre-feet and is located 70 miles east of Fresno at an elevation of 7,000 ft. It was constructed at a cost of approximately $4,750,000.

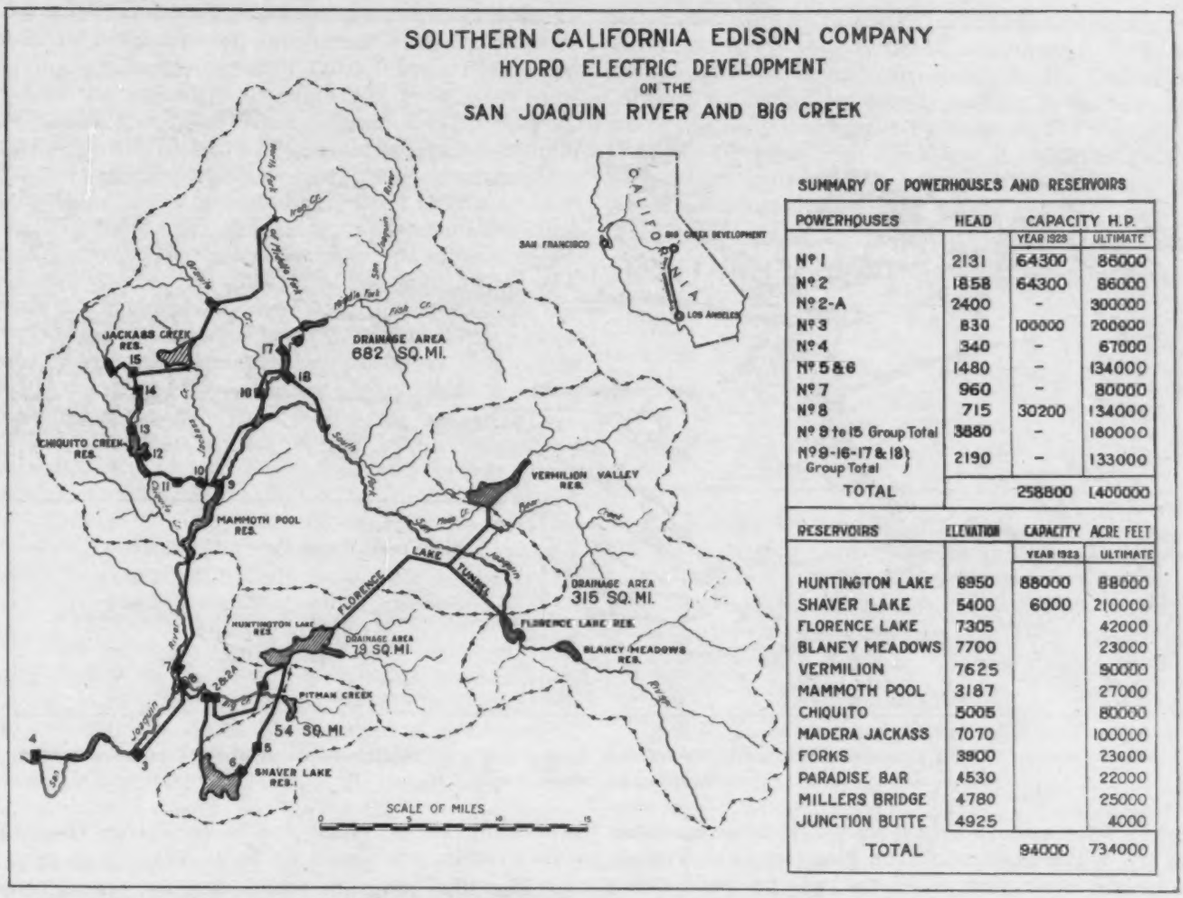
The drainage area of the streams whose waters will be utilized in the Big Creek plants consists of approximately 1,278 square miles hemmed in by the highest mountains in the United States. The accompanying map of this drainage area shows the relative locations of the plants and reservoirs comprising the project.

The South Fork of the San Joaquin River rises at elevations of 10,000 to 13,000 ft. and flows down to an elevation slightly above 7,000 ft. at the Florence Lake reservoir site. Between this point and the tail water of Power House No. 4 the river drops more than 6,000 ft., an aggregate fall of more than a mile through which the falling waters of this mountain

Table VI—Operating Plants—1923

	Installed Capacity Hp.-1923	Static Head	Kw-hr. Output 1922
HYDROELECTRIC PLANTS			
Big Creek plants operated with water from storage reservoirs.			
Big Creek No. 1	64,300	2131	159,682,000
Big Creek No. 2	64,300	1858	191,434,000
Big Creek No. 8	30,200	729	82,129,000
Big Creek No. 3	100,000	830	.....
Total	258,800		433,245,000
BASE WATER PLANTS			
Operated from stream flow without storage reservoir.			
Kern River No. 1	26,800	874	169,904,000
Kern River No. 2 (Borel)	13,400	262	56,955,000
Kern River No. 3	42,900	800	206,834,000
Kaweah No. 1	1,800	1287	12,216,000
Kaweah No. 2	2,300	369	10,634,000
Kaweah No. 3	3,800	775	27,436,000
Tule	2,700	1130	18,499,000
Santa Ana River No. 1	4,000	760	27,331,000
Santa Ana River No. 2	1,300	310	10,441,000
Santa Ana River No. 3	2,600	352	12,875,000
Mill Creek No. 1	1,000	506	5,247,000
Mill Creek Nos. 2 and 3	4,300	627–1905	26,911,000
Lytle Creek	700	481	4,771,000
Sierra	800	625	5,586,000
Azusa	2,000	403	13,609,000
Fontana	2,400	770	16,161,000
Total	112,200		625,410,000
Total HydroElectric Plants	371,000		1,058,655,000
STEAM PLANTS			
Long Beach	63,000	....	68,681,000
Redondo	53,600	....	4,040,000
Santa Barbara	2,500	....	.....
Visalia	7,700	....	.....
Total	126,800		72,721,000
Total Production	497,800		1,131,376,000

NOTE: The Kilowatt-hours output from the Big Creek plants for 1922 did not contain any kilowatt-hours from the 3rd unit in B.C. No. 1 or from powerhouse B.C. No. 3, as these were not completed until 1923.



SUMMARY OF POWERHOUSES AND RESERVOIRS

POWERHOUSES	HEAD	CAPACITY H.P. YEAR 1923	CAPACITY H.P. ULTIMATE
Nº 1	2131	64300	86000
Nº 2	1858	64300	86000
Nº 2-A	2400	-	300000
Nº 3	830	100000	200000
Nº 4	340	-	67000
Nº 5&6	1480	-	134000
Nº 7	960	-	80000
Nº 8	715	30200	134000
Nº 9 to 15 Group Total	3880	-	180000
Nº 9-16-17 & 18 Group Total	2190	-	133000
TOTAL		258800	1400000

RESERVOIRS	ELEVATION	CAPACITY ACRE FEET YEAR 1923	CAPACITY ACRE FEET ULTIMATE
HUNTINGTON LAKE	6950	88000	88000
SHAVER LAKE	5400	6000	210000
FLORENCE LAKE	7305		42000
BLANEY MEADOWS	7700		23000
VERMILION	7625		90000
MAMMOTH POOL	3187		27000
CHIQUITO	5005		80000
MADERA JACKASS	7070		100000
FORKS	3900		23000
PARADISE BAR	4530		22000
MILLERS BRIDGE	4780		25000
JUNCTION BUTTE	4925		4000
TOTAL		94000	734000

Map of the drainage area of Big Creek and the San Joaquin River showing where the plants which will generate 1,400,000 hp. will be located.

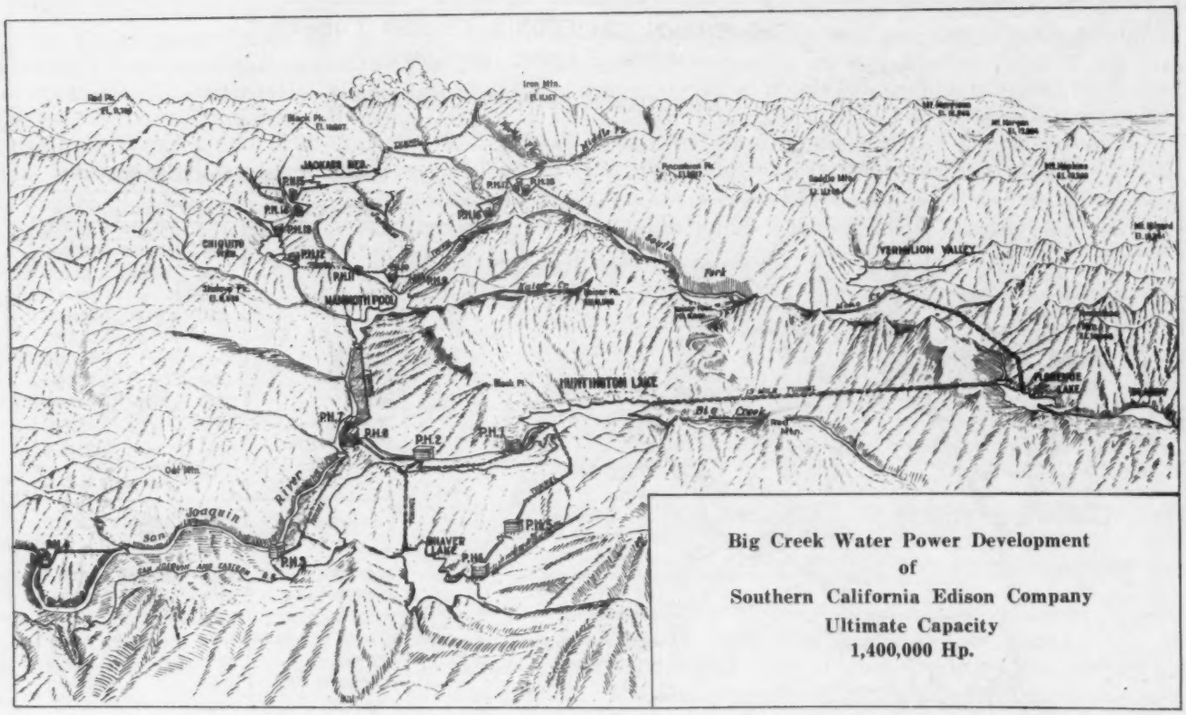
stream can be used for the generation of electric power. Big Creek, one of the principal tributaries, rises above Huntington Lake and falls a total of 4,720 ft. between the lake and its junction with the main river at the tail water of Power House No. 8.

The general scheme for developing this great source of hydroelectric power consists of the construction of a chain of power houses in series between Huntington Lake and Plant No. 4. This chain of power houses in the order of their location, beginning at Huntington Lake, will consist of Nos. 1, 2, 8, 3 and 4. Water from Huntington Lake will also be conducted to a second reservoir to be constructed, known as Shaver Lake, with a capacity of 210,000 acre-feet. This water, in its passage between the two reservoirs will go through Power Houses Nos. 5 and 6. From Shaver Lake the water will then pass through Plants Nos. 2-A, 8, 3 and 4. Plant No. 2-A, with an ultimate capacity of 300,000 hp. and a head of 2,400 ft., will be the largest on the project and will have the highest head of any plant in the United States.

In addition to these, preliminary plans have been adopted for the development of a series of plants on the Middle Fork of the San Joaquin River, Jackass Creek and Chiquito Creek. Of this series, Power House No. 7 will have an ultimate capacity of 80,000 hp. under a head of 820 ft. Plants Nos. 9-15 will be capable of developing 180,000 hp. under a total head for the entire group of 3,750 ft., while plants Nos. 9, 16, 17, 18 will be capable of turning out 140,000 hp. under a total head for the group of 2,150 ft. All data regarding these plants, which are known as the West Side Development, are approximate and future demands for power may change these plans materially.

The principal hydraulic features of the project are shown in schematic form in the accompanying artist's conception of the drainage area showing the tunnel lines, pressure pipe lines, reservoirs and power plants.

Huntington Lake is now supplied exclusively from Big Creek. In order to increase the water supply to the plants below this reservoir, the development program includes the construction of Florence Lake tunnel, 13.5 miles in length, with a capacity of 1,000 sec.-ft., which will tap the South Fork of the San Joaquin at Florence Lake. This tunnel, which is being built through solid granite, will be completed by April, 1926. Through it the waters of the South Fork of the San Joaquin, together with Mono and Bear Creeks, will be diverted into Huntington Lake. Later on a tunnel will be built to Shaver Lake in which will be stored such



Bird's-eye view of the Big Creek-San Joaquin River drainage area showing the relative locations of the various reservoirs, tunnels and power plants.

excess waters above the capacity of Huntington Lake as are delivered through the Florence Lake Tunnel. Complete utilization of all the waters made available through Florence Lake Tunnel will produce, through the chain of power houses below Huntington Lake, 1,750,000,000 kw-hr., representing a value in the power market of over $30,000,000 annually.

Table VII—Summary of Tunnel Lines Big Creek-San Joaquin Development

Description	Section Sq. Ft.	Capacity Sec. Ft.	Approx. Length Miles
Mono and Bear Creek to Florence Tunnel	120	600	6.4
Florence Lake to Huntington Lake	200	1,000	13.0
Huntington Lake to P. H. No. 1	112	800	.7
P. H. 1 to P. H. 2	112	700	4.0
P. H. 2 to P. H. 8	340	2,050	1.1
P. H. 8 to P. H. 3	415	3,000	4.7
P. H. 3 to P. H. 4	415	3,000	3.0
Huntington Lake to P. H. 5	200	1,100	6.0
P. H. 5 to P. H. 6	200	1,100	2.5
Shaver Lake to P. H. 2-A	300	1,500	2.6
WEST SIDE DEVELOPMENT (Information not complete—data approximate.)			
Iron Fork to Madera Jackass Reservoir	80	400	9.5
Madera Jackass to P. H. No. 5	70	350	2.5
P. H. 15 to P. H. 14	80	400	.2
P. H. 14 to P. H. 13	80	400	1.0
P. H. 12 to P. H. 11	130	650	2.4
P. H. 11 to P. H. 10	130	650	1.1
P. H. 10 to P. H. 9	130	650	.7
Junction Butte Reservoir to P. H. 17	100	500	2.2
Paradise Bar Reservoir to P. H. 16	160	800	2.7
Hoffman Creek to P. H. 18	50	250	4.6
Forks Reservoir to P. H. 9	170	850	4.7
Mammoth Pool to P. H. 7	250	1,250	8.0
Total			83.6

The completed development will include approximately 83.6 miles of tunnels of which the Florence Lake tunnel is the longest. Data on the tunnels, practically all of which are to be driven through solid granite, are shown in Table VII.

The 1923 program, which is under way at the present time, involves the expenditure of $26,000,000 as follows:

Water Power Development	$11,851,000
220,000-Volt Transmission Lines and Substations	4,149,000
Steam and Miscellaneous Water Power Plants	265,000
Transmission Lines and Substations—(60,000 volts and under)	1,535,000
Distribution Lines and Substations	6,800,000
Miscellaneous	1,400,000

The item, water power development, includes the completion of Big Creek No. 3, consisting of three units of 33,000 hp. each, the first of which will be put into operation in August, 1923, to be followed by the remaining units in September and October. Also a third unit of 21,400 hp. will be installed in Power House No. 1 and will be ready for operation in July, 1923. In addition to these power houses, active work will be continued on the Florence Lake tunnel which is 20 per cent complete at the present time.

Work on the 220,000-volt transmission lines and substations includes changing over the present 150,000-volt Big Creek lines to 220,000 volts and the installation of two banks of 220,000/150,000-volt autotransformers at Big Creek No. 1, Big Creek No. 2 and Vestal Substation. Each bank will have a capacity output of 52,500 kva., equivalent to the full station capacity of either of the two plants. There will

also be installed at Eagle Rock substation two banks of 200,000/150,000-volt auto-transformers, each bank having a capacity output of 110,000 kva. Before the end of the present year there will have been completed the new 220,000-volt Laguna Bell Substation, with an initial capacity of 120,000 kva. and a 30-mile 220,000-volt transmission line connecting the new substation to the present Eagle Rock station.

The reason for increasing the transmission line voltage to 220,000 volts is purely one of cost. The present lines at 150,000 volts are fully loaded and with the increase in generating capacity due to the completion of the present plants under construction, new lines would be necessary to bring this power to the load center. The capacity can be doubled either by building two new lines at 150,000 volts at a cost of $12,000,000 to $15,000,000, or by increasing the voltage of the present lines to 220,000 volts at a cost of approximately $3,000,000. The elimination of not less than $9,000,000 from the construction cost results in a saving of $720,000 a year which is passed on to the consumer in the form of decreased rates.

Pioneering in High Tension Transmission

The Southern California Edison Company has consistently pioneered in high tension transmission, having been the first company to operate lines at 30, 60 and 150 kv. With the commercial operation of the Big Creek lines at the record breaking potential of 220,000 volts by May 1, 1923, it will have again set a world's record for the economic transmission of electrical energy at high voltages from generating plant to load center.

The Edison construction army, which is engaged in the development program, is working over a line of 30 miles, extending from Florence Lake far over the Kaiser ridge in the high Sierra to the site of Power House No. 3, near the bottom of the San Joaquin gorge. The problem of transporting supples and materials to five thousand men has been one of the engineering difficulties to be overcome. Roads have been blasted from solid granite cliffs. Telephone lines have been built for communication purposes and radio stations installed so that those supervising the work may be in constant touch with each field unit, even during the winter months when half of the camps are completely isolated from the rest of the world by deep snows. Mail is carried into these camps in the winter months by a team of Alaska huskies over snow 16 ft. deep.

Then there is the human side—the task of providing amusements, proper quarters, and medical attention for the workers. There are recreation centers and hospitals even in the farthermost camp. The men know they are working on one of the greatest construction jobs ever undertaken in this country, and in consequence have established construction records never before achieved.

Customer-Ownership

There is one last question in connection with an undertaking of such magnitude as this. Where is the $300,000,000 necessary for its building to be secured? The answer is simple: from the people who are to derive the ultimate benefits from the power which is to be generated—the ultimate consumers. Following out a policy of customer-ownership, the Southern California Edison Company is seeking to make each one of its many consumers a partner in the business. That this plan has been successful is shown in Table VIII, which indicates the growth in the number of consumer-owners since this campaign was under-

Table VIII—Growth in Number of Stockholders

	Number of Stockholders
July 1, 1917	1,864
Dec. 31, 1917	4,213
Dec. 31, 1918	3,940
Dec. 31, 1919	7,016
Dec. 31, 1920	7,197
July 1, 1921	16,984
May 15, 1922	36,700
Dec. 31, 1922	48,108

taken in 1917. On Jan. 1, 1923, the number of stockholders was 48,108, ninety-eight per cent of whom reside in California and seventy per cent of whom were supplied by the Southern California Edison service. New customer-owners are being secured at the rate of 2,000 a month.

The Colorado River

California is still in its infancy. The future holds forth greater promise for development and expansion than has been accomplished in the past. This growth will be dependent to a large extent upon the power supply. It is estimated that the need for power in California will exhaust the hydroelectric resources of the state within fifteen years. However, the Colorado River below Lee's Ferry, exclusive of the Grand Canyon, offers possibilities for the development of 3,500,000 hp. of electrical energy, a pro rated part of which will be available for use in southern California.

Within the next few years the demand for the regulation of the Colorado River to overcome the present flood hazards and the need for power in Arizona and the entire Colorado River Basin, will be such that the development of this stream will be vitally necessary. Its development will serve not only to meet the present power requirements in the Colorado River Basin, but will also stimulate general community activities throughout the entire Southwest, including California, with the result that additional power markets will be created.

The Southern California Edison Company stands ready to construct the necessary works on the Colorado River under Federal regulation in a manner that will secure relief from flood danger and provide power for the entire territory. Its ability to carry out this great work is demonstrated by its successful execution of the Big Creek-San Joaquin River project, a task of equal magnitude. In undertaking the development of the Colorado, the company would proceed in the same way that it has in the past, taking in as partners all of the people of the Colorado River Basin. Such a system of development would work the highest justice in economic service to the consuming public, the employees and the investor.

An Interview with General J. G. Harbord

President Radio Corporation of America

By Norman S. Gallison

RADIO today possesses the potentialities that the automobile industry did twenty years ago. Every home offers possibilities for the installation of some form of radio set. Opportunity so far as the electrical industry is concerned, is at hand. Because General Harbord heads the largest radio concern in the world, it was thought that any remarks he might make on the subject of radio would prove of more than passing interest to the members of the electrical industry here in the West. It was with this in mind that the following interview was obtained.

For those who do not know, General Harbord was one of the outstanding American officers in the World War. As chief of staff for General Pershing, he played an important part in the organization of the American Expeditionary Forces. He commanded the Marine Brigade of the Second Division in the Verdun sector during the fighting at Belleau Wood and Bouresches near Chateau Thierry, which stopped the German advance on Paris in June, 1918. He commanded the Second Division during the Soissons offensive. Later as commander of the Service of Supply, he was faced with the task of keeping the A.E.F. supplied with food, clothing and munitions. He resigned from the regular army on Dec. 29, 1922, and became president of the Radio Corporation of America Jan. 1, 1923.

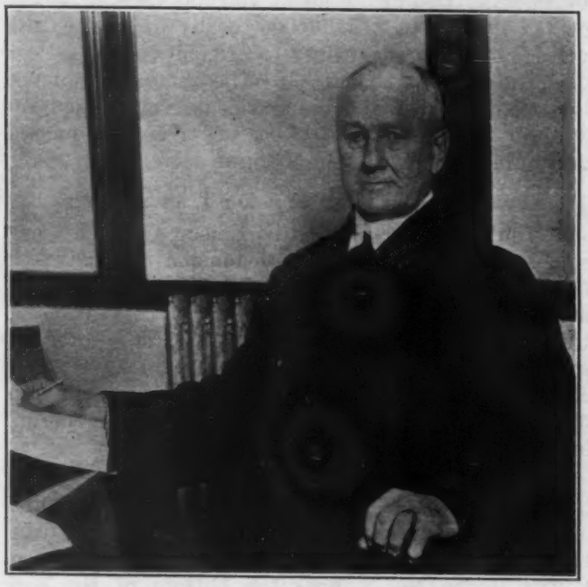
The interview follows:

General Harbord, we understand that you have been in the army all your life. Are you a West Point graduate? When you were graduated from West Point, what branch of the service did you join?

I am not a graduate of West Point. I entered the Army when I was 22 years of age. After completing the course at the Agricultural College of Kansas and teaching school a year, I enlisted as a private with the idea of getting a commission. I served in the ranks two and one-half years and got the commission, which was that of Second Lieutenant, Fifth Cavalry.

During the course of your army career were you especially interested in communication work, which, I understand, is ordinarily the function of the Signal Corps? Obviously, the matter of communications between the front and the various supply depots must have given you a vivid presentation of the value of radio during the World War?

The Signal Corps has charge of the electric communications of the army. I was not especially concerned in the work of the Signal Corps. I spent some 12 years in the Philippines, where I was one of the heads of the Philippine Constabulary. I had a good deal to do with matters that gave me an opportunity to see how important these communications were. During the war, when I was in command of the Service of Supply, I was very much impressed with the importance of communication systems—that they were the nerve system of the whole military organization. The Signal Corps in France under the Service of Supply, of which I had command, had at the close of the war a network of constructed and leased lines in France of over 34,000 miles and they had themselves strung over 100,000 miles of wire. At the close of the war we had a communication system handling 45,000 messages daily, of an average of 60 words per message. The



James G. Harbord, president, Radio Corporation of America

credit for that is due to General Russell, Signal Officer, A.E.F. It was only one phase of my business.

Now we understand you have become president of the Radio Corporation of America. Have you progressed far enough along in this connection to express an opinion as to the lines along which the commercial development of radio will extend?

My opinion on that would be that of any ordinarily intelligent man who is more or less familiar with the situation, namely—the organization of the Radio Corporation was originally for the purpose principally of trans-oceanic and international communication by wireless. The development of the radio art and the organization of the Radio Corporation brought to us in the radio field the possession of a number of patents, which with the whole development of broadcasting, made it a perfectly natural thing for the Radio Corporation to assume that function which is equal in importance to its original purpose of communication. Thus the indicated development of the Radio Corporation is along the line of international communication and the development of radio broadcasting in this country. The catering

to its immediate needs naturally leads to the manufacture and sale of apparatus and parts.

As we understand it, the development of radio commercially is a field distinct from the broadcasting activities. Do you believe that radio broadcasting will eventually largely supplement, if not in part displace, present methods for the disseminating of news, market reports, weather reports and entertainment?

I think that it will supplement them. I don't believe that the time will ever come when it will replace newspapers and agencies of that sort. Broadcasting of market reports and such information falls on the ears of a million people but no one makes a record of it and it is out and gone. You pick up your daily newspaper, read it this morning and because you note something of more than passing interest, you lay the paper away on a shelf where it will remain for a year or more, a matter of history. I do not think broadcasting will ever replace the printed page where any of the more permanent appeals to the people are concerned, but I do think it is the most powerful humanizing agency in the world. The daily papers may put over some particular piece of information but they do not reach everyone at the same date or same time. We can reach many millions of people through radio broadcasting simultaneously. To read a newspaper and to subscribe to a daily newspaper means a certain amount of education on the part of the person who reads it and financial ability to subscribe to daily papers. But by broadcasting, these people have a means of getting the benefit of news or information of any kind without even knowing how to read. To groups of people of that sort, one broadcasting set with proper amplifiers will reach great numbers at the same time. Broadcasting may supplement, but it will never replace the printed page. People, throughout the ages, have had a tendency to believe that important new inventions were going to disrupt the social and economic scheme by putting many people out of employment. They have always resulted in more work for everybody—the cotton spinner, the locomotive and various forms of mechanical devices have not produced lack of employment.

In your opinion, do you believe that the recommendations of Secretary Hoover for the imposition of federal regulations governing the transmission of radio messages is practical and can be made effective?

I believe regulation is essential. The situation now is that the law has not been changed since 1912. A very large number of wave lengths were reserved for government purposes in this country, leaving only a fraction of the wave lengths for use for commercial purposes. Changes in the law are badly needed. There is an appeal for everybody's interest in broadcasting. We are very strong in the belief that it should be properly regulated by the federal government.

Do you think that because a man owns a 50-foot lot he owns all of the air above?

I do not think there is very much in that. We do not allow a man on his 50 ft. of ground to maintain a nuisance in any form or keep it unsanitary or unhygienic. Why, then, should you allow him to pollute the air above him? The air lanes belong to all of the people.

Do you believe in the development of radio that industrial history will in any way repeat itself, and that ultimately the same situation will obtain as now exists in the steel industry where a few large corporations control the market, or will there always be a field for the small individual manufacturer?

I think that there will always be a field for the small individual manufacturer. There are hundreds and thousands of manufacturers here now and more and more of these small manufacturers will come into the field as the art develops. The radio industry will tend to simulate the automobile industry rather than the steel industry. I think that things will soon be standardized and that in a very few years you will see manufacturers of radio wherever they are justified, just as it is now in the manufacture of lamps and other electrical devices.

What do you think of the future of radio insofar as it affects the future of the electrical distributor and the electrical dealer? Are these groups taking the fullest advantage of the present opportunity afforded by radio?

I do not think that they are taking the fullest advantage of their opportunity. The demand for electrical apparatus in this country has been such that they have largely become necessities. In their particular fields, it is the part of the electrical dealers to sell what they have. Someone wants a particular kind of apparatus or a certain lamp. The dealer doesn't have to run after him to sell him that. He goes into the store and buys it. My observations of electrical concerns are not particularly close or broad, but I do not think they are especially well organized as yet for merchandising radio equipment. As Mr. Sarnoff stated in his talk the other day, we feel that the potential customer for radio business of the future is very apt to be a lady. Radio devices are becoming more and more decorative and it takes a woman's taste to see that they match the rest of the furniture. When you have a lady customer you have to provide the little accessories that appeal to her and attract her. I do not think the electrical concerns have waked up to this fact. They do not show as much initiative along that line as the music dealers, for instance, or the big department stores. The field is there.

Do you believe that the prediction made in Bellamy's "Looking Backward" may in time justify the author's prophetic vision in which, as you will remember, in every household, market reports, music, the drama, news and the sermon were instantly available during certain hours of the day at the will of the citizen?

It's over 20 years since I read that book. As you sum up his prophecy, I feel that it is almost here now. Such facilities are available if we want to take advantage of them. Putting a radio set into the home means getting the money to pay for it and selecting a good set, that's all. Opportunity is knocking at the door this moment. It is here today.

Thank you, General Harbord.

ELECTRICITY IN INDUSTRY

By Louis F. Leurey
Industrial Electrical Engineer

Automatic Control for Compressor Made from Stock Street Car Parts

THE Market Street Railway of San Francisco has operated for a number of years a large quarry from which it has secured much material for track ballast. About six years ago John T. Gaylord, foreman for the railway company, devised a very practicable and comparatively inexpensive plan for controlling this air compressor automatically so as to take care of the demands upon the air reservoir tank.

Compressed air drills at the quarry were supplied with air from the reservoir of the compressor and except for conditions of starting and stopping no attendance was needed at this point. From the point of view of efficiency it was necessary that the air pressure be kept between the maximum and minimum limits of 100 and 85 lb. respectively.

Mr. Gaylord undertook to save the cost of attendance at the compressor by rigging up an automatic control starting and stopping device on the compressor motor. As the company operates a street railway system, all parts used in this device are stock equipment used in other departments of street railway work which was naturally a considerable advantage from the point of view of maintenance and replacement.

The accompanying drawing shows in detail all of the elements of the plan which, briefly, consists of using a standard governor such as is used in connection with street car compressor motors. The governor in turn admits air to a cylinder and piston which by means of valves, normally used in compressed air whistle lines, operates with graduated movement, a contact brush which slides over the contact plates and these plates in turn cut in and out sections of resistance to the motor.

Provision is also made by means of a double throw bypass switch and a series of snap switches for contactor control so that when there is no pres-

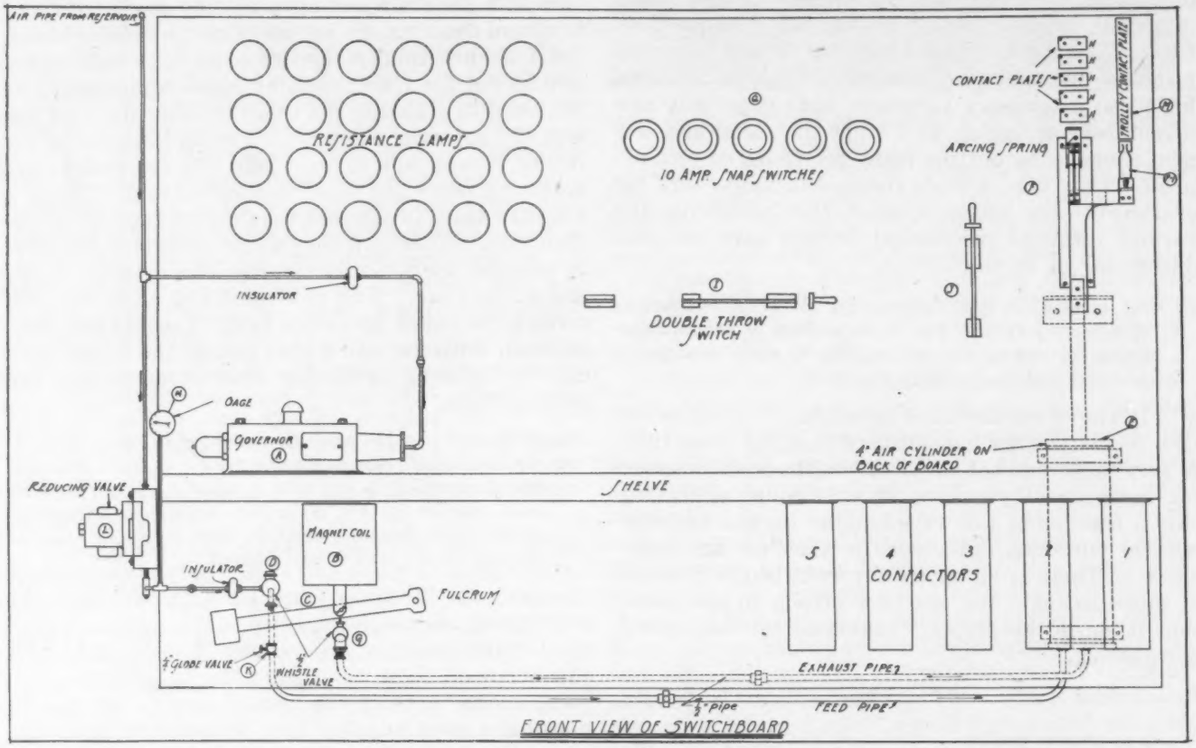


Diagram of the switchboard installed at the marble quarry of the Market Street Railway Company of San Francisco. The equipment on this board was all secured from the stock parts used on street cars of the company.

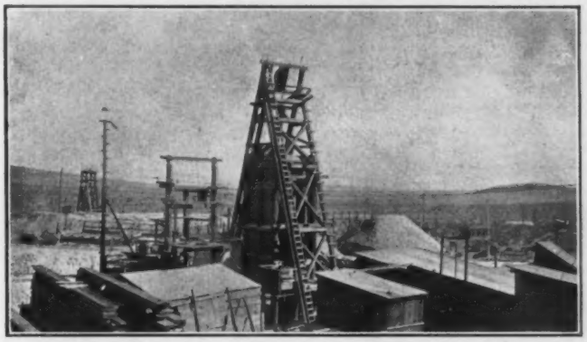
sure in the tank the motor can be manually started at the beginning of the day's work.

It is quite possible that if the railway company were to make this installation today it would have no trouble in finding standard equipment which would save it from the development of special equipment of this type, but it illustrates in a notable manner that the remarkable development in controlling devices during the past four or five years has been in response to an insistent demand on the part of the electrical users for the elimination of all unnecessary manual operations in electrical control.

Central Station Service for the Miner

JUST as electricity has entered the modern city and driven other forms of power and light from the field, so it is serving the mining camps in the vicinity of Randsburg, Calif., providing them with an inexpensive and efficient motive and illuminating force. Hand power, water power and steam power have given way to the more easily controlled and more effective electrical drive.

As evidence of the fact that not all of the discoveries of deposits of precious metals were made in



Head frame of the California Rand Mine, one of the properties in the Randsburg district that is operated by electricity.

the "Days of '49," is the Kelly mine which was located in 1918. This is a silver bearing property which was "staked out" by three prospectors, and has since proved to be so rich in minerals that the prospectors were able to ship high grade ore after sinking a shaft only a few feet.

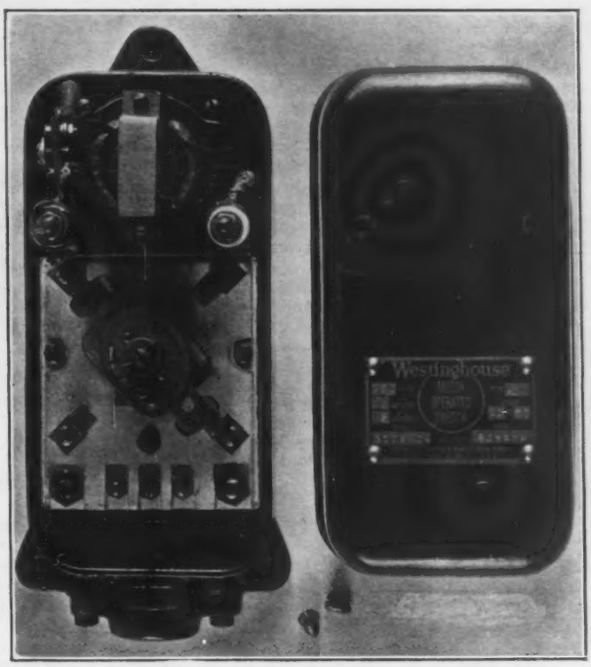
This mine is of particular interest to the electrical industry when it is known that in 1919 the ore was hauled from the shaft by means of a one-man-power hoist and at the present time 1,000 hp. of electrical equipment has been installed on the property. This mine has been supplied with power by the Southern Sierras Power Company, of Riverside, Calif., and it is partly due to the interest of the power company in aiding the engineers of the company that the modern installation has been made.

The success with which electricity has been employed in operating the larger mining properties in the Randsburg district has led the smaller operators to install electrical equipment in their properties also. A typical installation sufficient to develop a depth of 500 ft. consists of a 50-hp. slip-ring motor on single drum hoist, a 75-lb. squirrel cage motor on compressor, and a 10-hp. squirrel cage motor on the blower. In addition a lighting load of 2 kw. is usually necessary. The standard service is 440 volts and due to small area it has been found expedient to distribute from one 33-kv. substation to the various properties. The diversity factor is high and it is observed that these properties during development will show a 60 per cent demand and 50 per cent load factor. With the installation of a 100-ton mill the connected load increases approximately 300 hp. and due to continuous operation, the above conditions are materially improved and the mining companies decrease their unit power costs.

Automatic Control for Small Currents

INDUSTRIAL establishments are rapidly learning the great operating advantages of automatic electrical control not only for the heavier operations but for the numerous minor operations throughout the industrial plants, all of which form an important part in producing the manufactured product.

One of the most recent devices introduced on the Pacific Coast to assist in automatic control of cur-



Motor operated switch designed for automatically controlling currents for equipment drawing comparatively low amperage.

rents up to 20 amp. 220-volt or 30 amp. 110 volts, is shown in the accompanying illustration.

This device consists of a motor driven snap switch enclosed in an iron clad case and is of extremely simple but very rugged construction. It very readily adapts itself in connection with thermostats to control small industrial heaters, glue pots and the various types of industrial baths that must be maintained at constant temperature and whose usage of current is within its range of capacity.

JOBBER, DEALER AND SALES AGENT

How Many Electrical Men are Electrical Users

California Electrical Cooperative Campaign Figures Show that Members of Industry Have Many Appliances

In order to determine the number of men in the electrical industry in San Francisco and Los Angeles who really believed in the electrical idea to the extent that they would install appliances and electrical equipment in their own homes, the California Electrical Cooperative Campaign recently conducted a survey among the members of the San Francisco Electrical Development League and the Los Angeles Electric Club. A total of 395 answers were received from the associations and from these returns an average per thousand homes was secured.

One hundred and forty-nine members of the San Francisco Electrical Development League reported that they had a total of 928 appliances in their homes, while 246 Los Angeles electrical men stated that they had in their homes 1,792 electrical appliances which were being used to lessen the work of their wives. The complete tabulation as to the various appliances in use by the wives of the electrical men is shown in the accompanying table.

In addition to securing the actual totals, the numbers of appliances in use were figured to show the average number in use per thousand homes in the two cities. These figures show the average based upon the results obtained from the electrical men's replies.

This average number of appliances per thousand homes shows how the various appliances are regarded by electrical men of the two cities and in addition a comparison is made with national figures, for all residence users of electricity. These data were secured from a survey, the results of which were printed in the September, 1922, issue of "Electrical Merchandising."

In comparing these three sets of average figures it can be seen that in both of the California cities electrical men have more appliances per thousand homes than are present in the average thousand homes throughout the nation, with only one exception. The California electrical men have fewer electric fans per thousand homes than have the other residents of the nation. This is undoubtedly due to the fact that the summer weather in the two cities is not as intense as it is in other cities of the country. As regards every other appliance, the electrical men of the two cities have shown that they appreciate the value of appliances more than do the average group in the United States.

While the statistics on the number of appliances were being secured the electrical men were also asked to report the number of convenience outlets in their homes. Replies on this showed that in the 149 homes from which answers were received in San Francisco, there are a total of 689 convenience outlets or an average of 4.6 per home and the Los Angeles men reported that in 102 homes there are 625 convenience outlets or an average of slightly over 6 per home. No national figures are available to compare with these totals.

The results of the questionnaires sent to these electrical men show that the men are themselves sold on the electrical appliances that they are behind and that the work among the members of the industry to encourage them to use electrical equipment has borne fruit. Statistics showing the public that the electrical industry is behind the electrical idea and is itself using the appliances that are offered to the public are of great value in convincing the possible purchaser that electrical devices are adapted to his needs.

APPLIANCES	APPLIANCES ACTUALLY IN USE		AVERAGE PER M. HOMES		
	San Francisco (149)	Los Angeles (246)	San Francisco	Los Angeles	*NATIONAL
Irons	163	308	1,094	1,250	720
Toasters	111	182	745	740	112
Air Heaters	110	81	738	329	130
Percolators	101	198	677	804	53
Vacuum Cleaners	78	175	523	711	360
Washing Machines	51	98	342	398	295
Waffle Irons	43	69	288	280	
Curling Irons	35	111	235	451	
Grills	33	74	221	301	
Ranges	29	18	194	73	16
Sewing Machines	26	106	174	431	48
Warming Pads	26	139	174	565	
Water Heaters	21	15	141	61	
Chafing Dishes	16	25	107	102	
Disk Stoves	11	0	74	0	
Fans	10	86	67	350	360
Ironing Machines	7	13	47	53	12
Samovars	7	0	47	0	
Vibrators	6	55	40	224	
Violet Ray	5	0	34	0	
Utility Motors	5	10	34	41	
Mixing Machines	4	7	27	28	
Immersion Heaters	4	0	27	0	
Dish Washers	4	3	27	12	11
Radio	3	0	20	0	
Cookers	3	0	20	0	
Milk Warmers	3	9	20	37	
Soldering Irons	2	0	13	0	
Hair Dryers	8	8	13	33	
Miscellaneous	9	2	60	8	
	928	1,792	6,223	7,282	

*See Electrical Merchandising, Sept., 1922.

Locating the Electrical Contractor-Dealer's Store

A Southern California Dealer Found that People Who Were Two Blocks from His Store Had Never Heard of It

Seven days a week the neighborhood store of a southern California electrical contractor-dealer was exposed to the eyes of the passer-by and six days a week the firm did a prosperous business. The owner of the establishment considered that he was making a good return on his investment.

However, the owner happened into a barber shop two blocks from his store one day and while there asked the barber why he did not liven-up his shop with more electric lights. The barber answered that he did not know where any electrical store near him was located. The electrical man was surprised at the barber's answer and decided to "check-up" on the standing of his establishment.

A number of inquiries were made throughout the neighborhood the store catered to, and the result of this casual survey astonished the owner of the electrical store. A great number of the people questioned, and a great many of them were business men, did not know where the nearest electrical store was located despite the fact that in many cases they were within two blocks of it.

As a result of this, the owner of the electric store ordered an electric sign which he hung in front of the establishment. The sign cost $125 and according to the owner's report, net profits in the first thirty days that it was in position, paid for the cost of the sign.

This southern California man discovered that to make any store well-known in the vicinity that it serves, some definite advertising scheme must be followed to place the location of the store in the minds of possible customers. The electric sign used by this dealer proved to be one of his best advertising devices, for it notified the people of the neighborhood, where electrical goods could be purchased.

This same contractor-dealer, after discovering that a store could be well established and yet comparatively unknown, determined also that it was to his interest to talk electrical appliances and electricity in general whenever he had the opportunity. It is his policy now, whenever he has the opportunity, to turn the conversation to the consideration of electricity and then to tie his store in with the electrical idea. In this way he advances the electrical industry and makes his store better known.

The advice of this contractor-dealer to the rest of the trade is that if a manager of an electrical firm wishes to increase the amount of business that it is doing, he should endeavor to determine how well his store is really known in the neighborhood that it serves.

Getting the place of business before the public is the duty of the electrical contractor-dealer and this duty can not be shifted. To get customers into the store, the manager must first make sure that it is well known. Electric signs have been found to be one of the most important aids to the merchant in establishing his store.

The Downer Electric Company of Santa Barbara, Calif., believes in the policy of advertising the location of its store to the extent that it spent in the neighborhood of $300 in placing an electric sign in front of the establishment. This is not the store referred to in the accompanying article.

MERCHANDISING — YES JOB BUYING — NO

By JOE OSIER

"When the boys who maintain expensive shops and offices and who keep the clerks, stenographers, wiremen and other employees out of the ranks of the unemployed—

"Learn to merchandise electrical goods as well as their own and their help's efforts and—

"Forget the figuring and price cutting and job buying—

"The sooner will they be able to retire and take up golf—carpet and otherwise—in real earnest."

The above remarks were made to me just recently by a man in my town who knows the electrical game from consomme to cigarettes and—

When I say cigarettes I do not mean the kind donated by jobbers and manufacturers' representatives for banquets.

Between puffs from a cigar—made of tobacco—which must have set him back a "hick"—

He outlined to me the futility of Men of the Trade trying to outbid each other for—

The short end of a mean job.

"Instead of merchandising they are murdering," he said. "Murdering their business—their chances for a competence, in the sere and yellow leaf, and scalping some other hopeful in the game.

"Don't misunderstand me," he continued, chortling—"I am not putting all of the men engaged in the electrical industry in the grease. Mainly the ones I am aiming my barbs at are the witless ones who stay clear of associations and who try to—

"Outsmart the sharpshooters.

"Birds of that feather are the fowls that are making it tuff for the legits; they are the ones who are gumming up the parade and who will continue the process until they have been educated in the ways of the real, high class business man who is in the game for—

"Money and not misery."

And the answer, as he explained it to me, is this: Sign 'em up in the associations—local, state and national and—

When they are in the fold—show 'em the error of their ways.

Prove to them that a sharp pencil and a fine figure never got anyone anything except—

Checks marked N. S. F. and letters from the w.k. Mr. Dun. Convince them that every time they buy a contract, they are paging the Receiver, and that any job bought at the expense of overhead and self respect is not worth—

A whoop in the naughty word.

For, hear ye this, brothers, there is no royal road to riches except the one marked—

Legitimate business practice.

And, I repeat and will continue repeating as long as I have eight fingers, two thumbs and a typewriter that—

Until every Man of the Trade is in the corral and the associations are functioning as they should—

The Electrical Industry will not have attained the goal which it so justly deserves.

P.S.—The last lines are not funny. They constitute straight talk from a straight tongue.

I'll lead the cheering.

Making the Electrical Sticker Most Productive

Denver Gas & Electric Light Company Capitalizes on Appeal of Timeliness and Novelty of Color and Form

Spasmodic advertising of any nature, no matter what merits the advertisements may have, can never be considered as the most effective sort. To make an advertising campaign productive, a definite plan must be formulated and this must be backed by persistence and experience. Modern competition for the trade of the public has made it necessary for the progressive merchant to advertise his products in a systematic manner.

Sticker advertisements, that have been attached to different pieces of literature, have been in use for a number of years and in many cases have proved to be remarkably effective. In most cases, however, the use of these pieces of illustrated literature has been spasmodic and as a result many merchants have given up the work of advertising in this way.

As a user of sticker advertising, the Denver Gas & Electric Light Company can claim both persistence and experience over several years. Occasionally a month is skipped, but it is the practice of this company to attach stickers to the bills sent out monthly. A regular printing of a sticker is 50,000.

When advertising material of any sort is distributed in such quantities as this, abundant thought should be used in conception, and clever craftsmanship in execution, of the idea. A printing of 50,000 stickers may cost the company, art work and all, in the neighborhood of $200. For postage, there is no additional expense as the monthly bills are going out anyway. Considering the cost of the advertising, and the great circulation obtained from it, the sticker merits all the cleverness that can be secured.

The sticker has certain outstanding favorable characteristics, simply because it is a sticker. First, it has color. Numerous experiments in the experimental laboratory have demonstrated the far greater attention-getting and interest value of the advertisement in colors compared with the advertisement without them. When the Denver Gas & Electric Light Company uses space in a Denver daily newspaper, color as an aid to advertising effectiveness is not available. When the same company advertises with a sticker, color is available as a basic condition.

The sticker has the appeal of the pictorial layout and will incorporate, if the advertiser so wishes, novelty of shape. Attached to a bill, the sticker is practically certain to "get before" the recipient, its pictorial treatment provides for this as the art work stands out strongly from the white billhead background. Starting with these advantages of the sticker, the advertising department of the Denver Gas & Electric Light Company follows certain principles which make stickers most effective. Samples of the stickers used may be seen on the opposite page.

Getting the Timely Appeal

When the model electric home was about to be opened to the public, the company got out a sticker, 6¾ in. x 4¼ in. The "message" consisted of a picture of the home, lighted up, at night, which occupied all but a narrow margin used by a caption. The caption extended an invitation to the reader and his friend to visit the home. It told how to get there, and the hours when open.

A sticker which was put out shortly after the electric home exhibition used a picture based on the living room of the home. In the picture, a central ceiling fixture not present in the actual room was incorporated. This sticker was used to advertise fixtures and as the people of Denver had just seen the home the time element was right.

The stickers many people are familiar with are the kind that are printed today and used for months. They have no news, or timely, appeal. When the Denver Gas & Electric Light Company gets news and timeliness into stickers, it makes them different from most stickers, and also it gets all the favorable psychology of the news or timely element. These are used only when the stickers have a connection with some recent event, thus keeping them up-to-date.

At the time of an election, a company sticker portrayed a lady displaying a Hoover vacuum sweeper. At the top were the words, "Beats All Other Candidates." In addition to this tie-in with current events the sticker had news value because it announced, "SPECIAL TERMS NOW!"

Making Prices News

Most frequently, perhaps, stickers of this company get news interest from some reference to a special price or special campaign. Incidentally, this news is in the nature of "bargain" news, the predilection for this by the average woman buyer is well known.

At a time when the market in electrical goods was witnessing many downward price changes, the company got out an unillustrated sticker, which read as follows:

Manufacturers
Announce
GREAT REDUCTION
IN PRICES
on
Many Electrical
Appliances
A few of the most attractive
are as follows:

Air-way sweepers	Kidphones
Flatirons	Grills
Percolators	Waffle irons
Toasters	Dishwashers
Electric sewing machines	Vibrators
	Chafing Dishes
Duplexalites	Electric Heaters
Lighting Fixtures	Table Lamps
Mazda Lamps	

Buy Now at a Bargain

When the company had a new-fixtures-for-old campaign on, a sticker used a whimsical sketch also used in newspaper advertising, and text which ran, "Hurray! Now we can have a new fixture. We can turn in that old one as part payment on a new fixture at the Denver Gas & Electric Light Company." One sticker was headed "For Three Weeks Only." It announced a "special reduction" on certain washing machines beginning at a stated date. Another sticker was headed, "Special Terms Now (The Month of March Only)."

When the element of timeliness can't be introduced in one way, it sometimes can be in another, using a literary trick. A sticker illustrating a fixture was headed, "Now's the time to re-fixture." The company used another device when a sticker was headed, "Hoover Time," with a giant figure "5" and the text, "Improvements Make the Hoover Electric Suction Sweeper More Desirable Than Ever."

Novelty and Variety of Form

This company's stickers adhere to no standard size or form, hardly any two being of exactly the same size. The customer gets no chance to become so accustomed to light company stickers that he doesn't look at them. Something new, always—a different size, or different color, or different pictorial treatment

Most of the stickers are of liberal size. There was one, however, which went out to patrons in the business district, which was only 2¼ x 4¼ in. It was printed on blue paper and was headed, "Pull" in red. The inscription in black was, "PULL trade your way all the time with Electric Lights.

"PULL money—more money—by attractive lighting.

"PULL. We can pull any load with Electric Motors."

At the foot was the suggestion in small letters, "If you remit by mail, enclose bill."

Contrast with this a sticker of irregular shape which follows at the top, roughly, the contour of the back and head of a woman who is drudging away at a tub, or a large sticker of a housewife, the lower outline of which followed the lines of the woman's skirt and feet. In this case, the text was printed on the woman's white apron. Another one was shaped like a tub over which was a woman, almost submerged in suds, the caption of which read, "Don't sizzle in suds. Do a cool washing on a Thor electric washing machine. Special terms during July."

Most of the stickers are rectangular. Sometimes the bottom is a long side, sometimes a short side.

Catchy Sketches Add

The clever artist can help mightily the advertiser who uses stickers, not in one way only, but in several. A Denver artist prepared a drawing which had at the top a sketch of a red house against a blue sky. A yellow moon hung in the heavens and a giant yellow clothespin extended over the lower section of the sticker in such a way as to give the effect of the lower section being "washing" pinned to a line.

Cleverness of this type in sticker design does more than get a close tie-up between design and product advertised. No washing machine was pictured on this sticker, but the effect of the giant clothespin and the wash-on-the-line idea was just as good. In addition, there is the average normal reaction to such artistic cleverness.

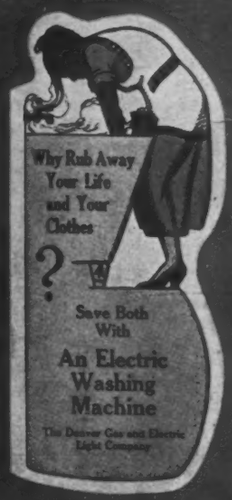
The sticker is only one form of advertising. It is, however, important enough to get plenty of earnest and skillful attention. The Denver Gas & Electric Light Company has found that the time and effort used in developing its sticker campaign has been well spent and will continue to send stickers to its light and power customers.

The Sticker~The Silent Salesman

DENVER'S FIRST MODEL ELECTRICAL HOME, just completed at 716 Clayton Street, is open every afternoon and evening for public inspection. You and your friends are invited to visit it today. Take 6th Avenue car, Route C or 7th Avenue Blvd., East, by automobile. Open daily from 2:00 P. M. to 10:00 P. M., STARTING MONDAY, MAY

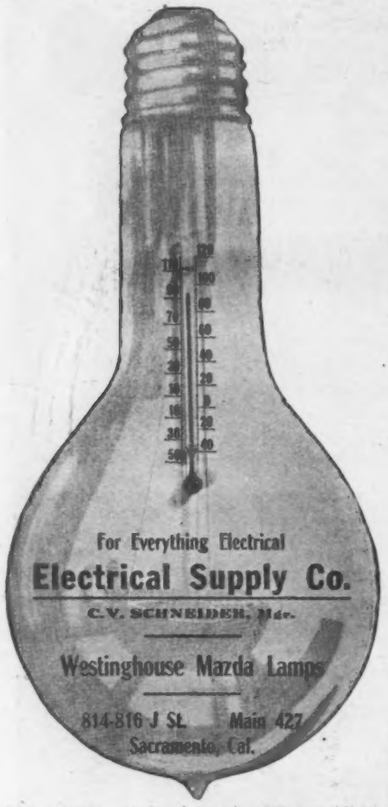
DON'T SIZZLE IN SUDS
do a cool washing
on a
THOR ELECTRIC WASHING MACHINE
SPECIAL TERMS DURING JULY
The Denver Gas & Electric Light Co.

Pull
PULL trade your way all the time with Electric Lights.
PULL money—more money - by attractive lighting.
PULL We can pull any load with Electric Motors.
If you remit by mail, enclose bill.



Sacramento Dealer Distributes Thermometer to Customers

Merchandising publicity of one class or another is an essential factor in calling public attention to the contractor-dealer's store. While much of this material is often distributed to the dealer by the manufacturer for ultimate public consumption, occasionally an enterprising dealer will bring out material of his own. Calendars are one of the most common forms of material of this character, but there are others equally as effective.



This effective piece of merchandising publicity was distributed to the housewives of Sacramento, Calif., by the Electrical Supply Company there.

The Electrical Supply Company, 814 J St., Sacramento, Calif., recently distributed among its customers a novel thermometer, which was the idea of C. V. Schneider, the store manager. As shown in the accompanying illustration, the thermometer was fashioned after a lamp. It measures 9½ in. from tip to base and 4½ in. across the widest part of the bulb. It was given to the housewife to be hung in the kitchen. It is printed in blue and black on white.

The thermometer is not exceedingly expensive and the idea is such an effective one that it can be adopted by any contractor-dealer who desires to bring out a new piece of merchandising publicity.

The Commonwealth Edison Electric Shops of Chicago publish in the advertisements of its Federal Washer a "Free Coupon for a Floor Pattern" which will show how the machine fits into the various spaces in apartment kitchens.

Order Blank for Switch Boxes Aid to Contractor

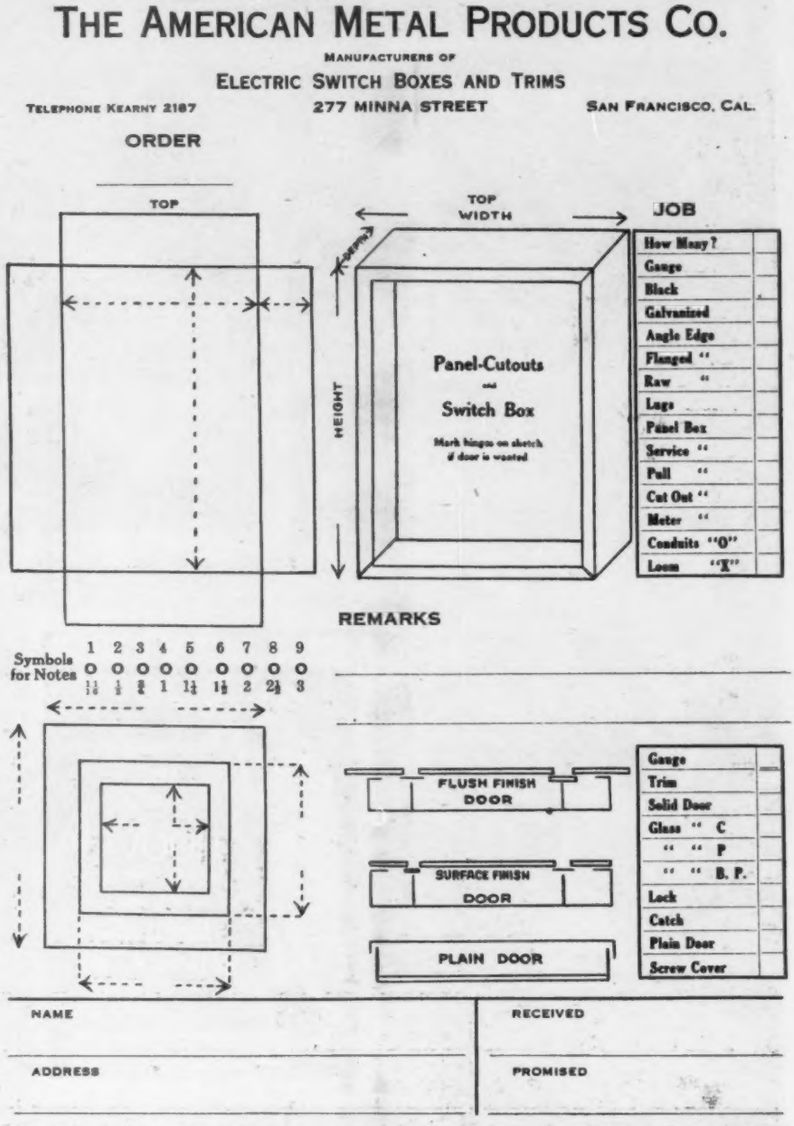
To simplify the work of the contractor in specifying the sizes and types for switch boxes and panel-cutouts, the American Metal Products Company of San Francisco, has perfected an order sheet which requires nothing but a few figures and check-marks on the part of the contractor to indicate the exact box that he desires.

While similar forms have been used by manufacturers, that designed by the American Metal Products Company incorporates all of the meritorious characteristics of any so far issued. As indicated in the accompanying illustration, it contains a plan of the metal blank before it is folded, a plan of the panel box itself and sketches of the various classes of doors that can be provided. With one of these orders specifying dimensions for a switch box is comparatively simple. Any explanations needed to supplement the dimensions and specifications provided for can be written in under the heading "Remarks" or on the back of the order

Contractors in localities where such forms are not provided by the metal shops can easily make up a similar order blank for their own use.

Instead of making a formal announcement of its removal, a Chicago concern retailing vacuum cleaners said it in this way: "The gently revolving brush and powerful suction of the Blank cleaner has picked us up and drawn us into a new and larger store at ——. Expanding business has made this move necessary."

The Salem Electric Company of Salem, Ore., a newspaper and a moving picture theater worked together to advertise radio and its equipment. While the theater was showing "The Radio King" the newspaper offered prizes for the best answers by children under thirteen to eighteen questions about radio and equipment. The electric company gave a crystal set as one of the prizes.



This simple form of order blank is provided by the manufacturer of switch boxes for contractors in order to simplify the task of specifying the size and type of box desired.

Large Electrical Installation in Seattle Apartment

Electricity in apartments as in other dwelling places is competing with other forms of fuel in the West, as is evidenced by reports from residents in the various states. To the electrical industry the growth of the electrical idea among apartment house and other large property owners is particularly pleasing for in one apartment house alone, a large amount of electrical equipment will be installed if the owner is sold on the electrical idea. Even when the equipment is installed, the market has not been closed, as the migrating tenants are always possible customers for appliances which can be used easily if the apartment is supplied with sufficient convenience outlets.

One of the most recently completed apartment dwellings in the western states, is the Spring Apartment-Hotel which has just been opened to tenants in Seattle, Wash. The apartment was built by W. A. Hainsworth, one of the city's most prominent citizens, and is the first hostelry of its kind erected in the Northwest and is said to be one of the finest structures devoted to hotel and apartment purposes on the Pacific Coast.

The structure, located on the northeast corner of Fifth Avenue and Spring Street, represents a total investment of $750,000. It covers a ground area 60 x 120 ft., is eleven stories high and is of reinforced concrete construction. The first floor, exterior, is faced with red brick, the remaining ten floors with cream brick trimmed with terra cotta.

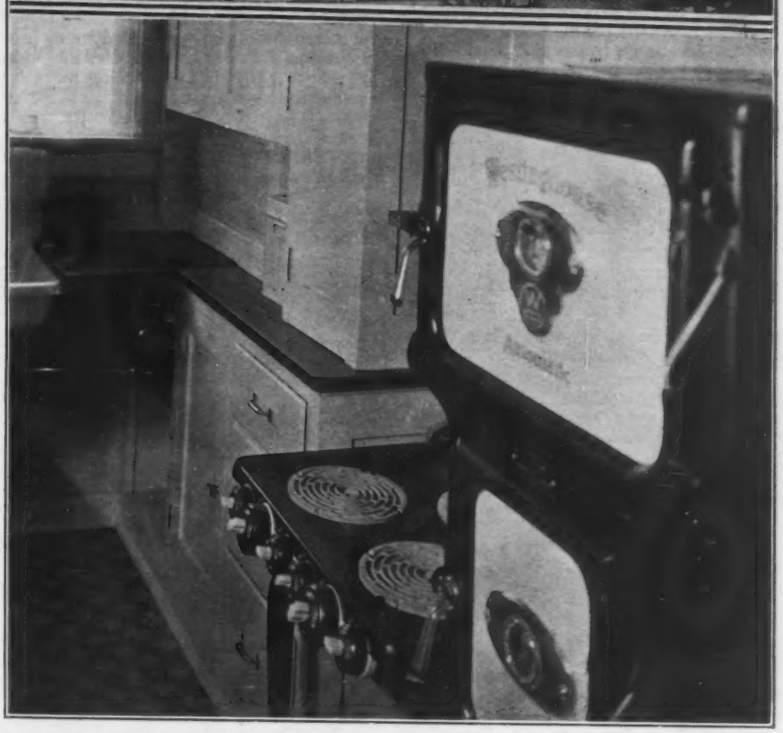
The building contains 117 apartments, 107 two-room and 10 three-room apartments. All told there are 244 rooms in the building. Each apartment is completely furnished and each of the 117 is equipped with a Westinghouse Electric & Manufacturing Company automatic range. This range installation is said to be the largest in the world and was handled by the Seattle Municipal Lighting Department, the utility that supplies current for the building. Each apartment is also furnished with a radio receiving set including a loud speaker. The building is wired for this purpose from a master receiver in the main office. This latter installation was furnished by the J. J. Agutter Company of Seattle.

The electrical wiring contract held by F. W. Rust & Company, Inc., Seattle, involved aside from the installation of an electric laundry and laundry driers, 150,000 ft. of copper wire; 50,000 lb. of conduit; 239 meters and other miscellaneous material and equipment.

The main line circuit breaker is 4,000-amp. capacity and was made especially for this building.

Each apartment has one iron outlet, one twin convenience outlet, to be used in the breakfast nook, one twin convenience outlet for the living room to be used for a vacuum cleaner or other appliance, and one twin outlet in the dressing room to be used for table lamps, curling irons, pads, fans, etc.

The structure was designed by John Graham, architect, Seattle, and erected by Hans Pederson, general contractor, also of Seattle.



(Above) Exterior of newly finished Spring Apartment-Hotel in Seattle, Wash., in which one hundred and seventeen automatic electric ranges were installed by the builder. There is a minimum of four convenience outlets in each apartment, many of these outlets being of the new duplex type. (Below) Electric ranges are installed in every one of the kitchens in the new apartment and in addition an iron outlet and a twin outlet are placed in the breakfast nook for use of appliances.

INDUSTRIAL NEWS

Changes in National Electrical Code Are Recommended

Following a public hearing conducted by the Electrical Committee of the National Fire Protection Association on March 12, at the rooms of the New York Board of Fire Underwriters, the committee held closed sessions on March 13 and 14 and determined to recommend to the National Fire Protection Association for adoption, proposed amendments to the National Electrical Code, a new edition of which is to be printed during the coming summer.

With a few important modifications the changes adopted are substantially those printed in the bulletin which was issued well in advance of the public hearing.

The proposal to require an approved weatherproof or rubber insulating covering for line wires operating at a voltage less than 500 was voted down. The proposal to require batteries between electric meters and gas meters was not adopted.

The proposed third paragraph of No. 15-A-j was modified to read as follows: "Where the secondary system is grounded at the service, the equipment, conduit, armored cable, metal raceways and the like may, by special permission, be connected to the circuit grounding conductor, but otherwise shall have a separate grounding conductor of its own."

No. 15-A-n first paragraph is to be altered to conform to the above requirement; and the proposed new sentence in the 5th paragraph of No. 15-A-n is to be dropped.

The wrapping and soldering of wires to form a ground connection is not to be absolutely prohibited.

The proposed requirement of a deep outlet box on side walls has been changed to a recommendation.

The requirements for outdoor antennae have been modified in such a way as to require proper clearances and substantial construction but not to prohibit these wires from crossing over or under electric light or power wires, as was originally proposed.

Investigation Is to Be Made of Columbia River Project

Secretary Hubert Work, of the Interior Department, who has recently announced that he has accepted an invitation to visit the Columbia River Basin project this summer, has stated that he has directed the United States Reclamation Service to conduct the investigation of the proposed Columbia Basin and Umatilla Rapids reclamation projects. Congress recently appropriated $150,000 for this investigation.

Secretary Work also announced that he had designated Assistant Secretary Goodwin, whose home is in Spokane, Wash., and Director Davis of the Reclamation Service, to advise him further as to the engineering, water, legal and other questions arising in connection with the projects.

Major-General Goethals, who has made some preliminary studies in connection with the projects for private interests, may be requested to act in an advisory capacity. On completion of the investigation, Secretary Work plans to submit a report and a recommendation to Congress.

Northern California Irrigation and Power Plant Planned

A proposal to develop 285,000 hp. from water secured from the Trinity River, in Trinity County, California, has been announced by W. H. Samson of Corning, Calif. It is the intention of Mr. Samson to develop this power and to use the water later for irrigating 400,000 acres of land in Glenn, Colusa, Yolo and Tehama Counties.

Mr. Samson and his associate, C. D. Hill, have been working on the project for some time and have filed many applications for water rights. The men have been aided in engineering work by Thebo, Starr & Anderton of San Francisco. The plan at present calls for a tunnel from Trinity County to the Sacramento Basin in Shasta County. Two hydroelectric plants are planned by the men. The estimated cost is $30,000,000.

Pacific Gas & Electric Co. Will Improve Drum System

Increase in the water facilities of the South Yuba-Bear River development of the Pacific Gas & Electric Company, whereby an additional 25,000,000 kw-hr. will be added to the annual output of the system, has been announced as a part of the construction program for the coming year. The raising of Lake Fordyce dam and the making of numerous improvements in the system below Lake Spaulding are included in the work to be undertaken.

The present Lake Fordyce dam, which was built in 1881, is 800 ft. long and 90 ft. high, impounding 20,000 acre-ft. It is planned to raise the dam 47 ft., increasing the capacity to 47,000 acre-feet, or more than double the present capacity. The Drum canal will also be improved and a second penstock installed at the Drum Power House.

An afterbay or reservoir will be constructed in the Bear River gorge half a mile below the Drum Plant in order to conserve the additional water which will come from Lake Fordye for use in the plants below.

Plans to Double Plant Capacity Made by Canadian Company

The West Kootenay Power & Light Company, of Rossland, B. C., a subsidiary of the Consolidated Mining & Smelting Company, has made application to the Provincial Department of Lands for permission to double the capacity of its power plant, at Bonnington Falls, near Nelson, B. C. The present plant has a capacity of about 30,000 hp. while the company owns a small auxiliary plant, at Grand Forks, which has a capacity of about 1,500 hp.

The extensions to the Bonnington Falls plant will necessitate the raising of the level of Kootenay Lake, and this, it is feared, may interfere with tentative plans that the provincial government had for reclaiming some swamp lands at Kootenay Flats.

The increased power is required for large industrial enterprises, and it is thought that this will outweigh any objections that the government might have with regard to the possible injury that the enterprise may have to its Kootenay Flats scheme. The increased power is needed primarily for the extension of operations at the Trail Smelter, where lead and copper are refined and zinc is produced electrolytically.

Recently the capacities of the lead and zinc plants have been doubled, and it is expected that this year the copper plant will be operated at capacity for the first time since its completion. Recently the Granby Consolidated Mining, Smelting & Power Company purchased the defunct Canada Copper Corporation's mine and concentrator, at Copper Mountain and Allenby, respectively, and it is prepared to enter into a contract with the West Kootenay company to take 5,000 hp. to operate machinery at mine and mill. Besides these large concerns, a number of small concerns are demanding increases in their power supplies.

By a vote of 30 to 10, the Senate body of the recent State of Washington Legislature in Olympia, Wash., passed the "Reed Power Bill" as the original measure came from the House, with slight amendments designed to prevent pyramiding of taxes by the municipality selling power. The bill provides permission for cities to sell power outside their corporate limits. The bill as it passed provides that the tax shall be collected by the city generating the power; it also carried a 5 per cent gross revenue tax, all of which goes to the state. The municipalities selling power are removed from the jurisdiction of the Department of Public Works for regulation and supervision. The bill contains a referendum clause.

Radio and Electrical Firms Are Ready for Exposition

Radio and electrical firms planning to exhibit their products at the Radio and Electrical Exposition to be held in San Francisco, April 3-8, have been busy preparing their booths in order to be ready on the opening day. In addition to the 144 display booths, which will contain radio and electrical equipment of interest to the public, there will be special entertainment for the visitors.

The radio exhibits will include the latest inventions and developments in both receiving and transmitting equipment and everything electrical will be displayed, from curling irons to large industrial motors. Manufacturers, dealers and power companies have been cooperating with the management of the exposition to make it a success.

A partial list of exhibitors is as follows:

Aerovox Company, S. F.
Atlantic & Pacific Radio Laboratories, N. Y.
Atlantic & Pacific Radio Supply Company, S. F.
Brandes, Inc., N. Y.
Bristol Company, Waterbury, Conn.
Chas. Brown & Sons, S. F.
California Electrical Construction Company, S. F.
California State Association of Electrical Contractors and Dealers, S. F.
A. D. Cardwell Company, Brooklyn, N. Y.
Carter Radio, Chicago, Ill.
Clapp-Eastham, Cambridge, Mass.
Eiseman Magneto Company, N. Y.
Electric Appliance Company, S. F.
Electric Storage Battery Company, Philadelphia, Pa.
Electrical Specialty Company, S. F.
Formica Insulator Company, Cincinnati, Ohio
Garnett Young & Company, S. F.
Gilfillan Bros., Los Angeles, Calif.
Gillespie-Eden Electric Company, N. Y.
Globe Commercial Company, S. F.
Gould Storage Battery Company, N. Y.
Geo. A. Gray Company, S. F.
Great Western Radio Company, S. F.
Hermans-Griffith & Company, S. F.
Heintz & Kohlmoos, S. F.
Home Radio Company, S. F.
Kellogg Switchboard Company, Chicago, Ill.
Colin B. Kennedy, St. Louis, Mo.
Kilbourne & Clark, Seattle, Wash.
Levy Electric Company, S. F.
McGraw-Hill Company, S. F.
Magnavox Company, Oakland, Calif.
National Carbon Company, Long Island, N. Y.
National Metal Moulding Company, Pittsburg, Pa.
Pacific Gas & Electric Company, S. F.
Pacific Radio Publishing Company, S. F.
Pacific Radio Trade Association, S. F.
Philadelphia Storage Battery Company, Philadelphia, Pa.
Post Electric Company, N. Y.
Radio Digest, Chicago, Ill.
Radio Industries Company, N. Y.
Remler Radio Manufacturing Company, S. F.
E. M. Sargent Company, Oakland, Calif.
Signal Electric Manufacturing Company, Menominee, Mich.
Simplex Wire & Cable Company, Boston, Mass.
Stromberg & Carlson Company, Rochester, N. Y.
Trumbull Electric Manufacturing Company, Plainville, Conn.
C. D. Tuska & Company, Hartford, Conn.
Union Construction Company, Oakland, Calif.
United Mfg. & Distributing Company, Chicago, Ill.
Victory Radio Company, S. F.
Warner Bros, S. F.
Western Agencies, Inc., S. F.
Westgate Metal Products Company, Oakland, Calif.
The White House, S. F.
Willard Storage Battery Company, Cleveland, Ohio
Wilson-McGuire Company, S. F.

Unification of Utah Railroads Is to Be Considered

Commencing April 11, the Interstate Commerce Commission will conduct a hearing in the United States district court in Salt Lake City, Utah., for the purpose of determining the feasibility of grouping various Utah railroad units under the tentative plan outlined by the commission.

The hearing will be conducted by Commissioner Hall and two examiners and will be attended by government agents, representatives of the state utilities commission, railroad representatives and spokesmen for the traffic committee of the Salt Lake City chamber of commerce.

The inclusion of the "short lines" in the program for discussion is of particular interest to Salt Lake City because of the transportation importance of the interurban electric lines which serve this territory. The Bamberger Electric lines, the Orem lines and the Utah-Idaho Central Railroad are the short lines which will probably present their recommendations during the course of the hearings.

The tentative report of the Interstate Commerce Commission recommends that the Utah Railway be consolidated with the lines in Group 16, which includes the Denver & Rio Grande Western and the Western Pacific, but the report outline does not refer to the fate of the three interurban lines which serve Salt Lake City.

Construction of Steam-Electric Plant in Oregon Started

The Northwestern Electric Company of Portland, Ore., recently commenced the construction of an addition to its steam-electric generating plant in the northern city. The excavation and pile driving work has been completed and the concrete work is under way at the present time.

The addition to the plant will be in the form of a 10,000-kw. turbo-generator. It is the plan of the company to have the new unit in operation by September. The unit is being supplied by the Westinghouse Electric & Manufacturing Company.

The company has just completed laying a three-conductor 250,000-circ. mil, 11,000-volt, rubber insulated armored submarine cable across the Willamette River, near St. Johns. This cable is 2,000 ft. long. A similar cable, 1,300 ft. long, will be laid across the Willamette River at Sellwood, in the near future.

Construction on an outdoor type substation, which will cost in the neighborhood of $75,000, has been started by the company at Vancouver, Wash. The capacity of the station will be 6,000 kw. and it will be used to step-down the 66,000-volt current to 11,000 and 2,400 volts. It is the company's intention to erect a 66,000-volt tie-line between Camas and Vancouver, a distance of 18 miles.

Large Transformer Order Placed by California Company

The Southern California Edison Company has placed with the Westinghouse Electric & Manufacturing Company an order for 2,000 distribution transformers amounting to approximately half a million dollars. The size of the contract, which is one of the largest ever placed for such apparatus, can be estimated by the fact that there are over thirty carloads of transformers in the order.

The transformers are to be used mainly for supplying power for motors for irrigating farm lands in southern California. This part of the state is dependent for practically all of its water supply upon wells, from which the water is pumped by electricity and distributed over the land in irrigation ditches; and for this reason the Southern California Edison Company is carrying out an extensive development of distribution lines throughout the territory which it serves.

Ground breaking for the addition to the steam-electric plant of the Northwestern Electric Company's plant in Portland, Ore., was viewed by only a few of the officials and employees of the company. Standing from left to right the men are: Tom Perry, superintendent of the Portland stations; E. F. Pearson, electrical engineer; C. J. Cook, excavation contractor; O. L. LeFever, general superintendent; L. T. Merwin, vice-president and general manager; A. N. Cudworth, auditor; A. W. Angell, purchasing agent; Jay Groo, sales manager; F. T. Hyskell, advertising manager; J. A. Hooper, operating department; W. Brenton, operating department; A. R. Boscow, industrial engineer, is sitting in the foreground.

Petition for Permit Conflicts With Earlier Request

A project which is in conflict with one for which the American River Water & Power Company has previously requested a preliminary permit, is the subject of the most important application presented to the Federal Power Commission at Washington, D. C., in the three-week period ended March 17. This application for a preliminary permit was made by Victor T. Matthews, who proposes to construct two storage dams on tributaries of the North Fork of the American River, in Placer County, California, to build a 300-ft. dam in the main stream, and a canal ten miles in length leading from the dam to a power house having a capacity of 12,500 hp.

An application was made by the Construction Company of North America for a preliminary permit to construct a dam and power house in the Sacramento River, near Keswick in Shasta County, California. The water stored behind the dam is to be used principally for power purposes, and also for sale to farmers and irrigation districts below the dam.

Three applications for licenses for small projects in California were received by the commission. These include one of the City of Sacramento, for small power development on the South Fork of the American River, to be used in a recreation park. Two small power projects on the Big and Little Kanatak Creeks in Alaska are the subjects of a request for license filed by B. A. Garber.

Officials of Radio Corporation Visit Pacific Coast

Interest in radio on the Pacific Coast has been heightened during the past fortnight by a visit to California of Major General James G. Harbord and

Major General James G. Harbord, president of the Radio Corporation of America, and Mrs. Harbord upon their arrival in San Francisco.

David Sarnoff, president and vice-president and general manager, respectively, of the Radio Corporation of America. The visits were the occasion for several meetings both in San Francisco and Los Angeles in which the electrical industry participated.

Mr. Sarnoff was the principal speaker at a meeting of the San Francisco Electrical Development League and the Radio Trades Association on March 19 when he addressed the members of

David Sarnoff, vice-president and general manager of the Radio Corporation of America, and Mrs. Sarnoff.

those organizations on "The Message of Radio." In his address he outlined the development of the art of radio telegraphy and painted a vivid picture of the future of radio. He urged the electrical dealer to take the fullest advantage of the opportunity which radio presents to him and predicted that the industry will be fully as important as the automobile industry within the next decade.

General Harbord addressed several meetings including the Members' Forum of the San Francisco Chamber of Commerce. He was the guest of honor at a banquet given at the Palace Hotel by the Association of the Army of the United States, which was attended by over 500 army officers and prominent citizens. Mr. Sarnoff was also one of the speakers at this banquet.

General Electric Employees Are Offered New Saving Plan

As a result of the founding of a new savings plan for the employees of the General Electric Company, a new company, the General Electric Employees Securities Corporation has been formed. The new company will issue no-par capital stock which will be purchased by the General Electric Company and will also issue fifty-year bonds bearing 6 per cent interest. Employees of the General Electric Company may purchase bonds on monthly payments up to $500 a year.

The new corporation will purchase securities of the General Electric Company and also those of public utilities with which the company has dealings. Seventy-five per cent of the securities will be secured from this last class of company.

Purchasing blocks of bonds from the securities corporation is not forced upon the employees, and divisions of the bonds will be as low as $10. The corporation will add two per cent to the interest rate of the bonds as long as the holder is in the employ of the General Electric Company.

Development of Electric Power Planned by Sacramento

Plans for a complete hydroelectric project to supply the City of Sacramento, Calif., and the outlying districts with electrical energy and water have been completed and July 2, 1923 set as the date for an election under the California municipal utility district act. It is estimated that the project will cost $8,000,000.

The development will be located on Silver Creek, a tributary of the American River. It will include the construction of a dam 130 ft. high at Ice House and a pipeline from the Union Valley damsite to the power house forebay above Big Bend. The pipeline will have a capacity of 450 sec-ft. of water. The forebay will be of sufficient capacity to carry the plant for a day and a half. The first installation at Big Bend will include two 20,000-hp. units. It is estimated that the initial project will cost approximately, $4,000,000.

Under the terms of the municipal utility district act, five directors will be elected who will be empowered to appoint a general manager, accountant, secretary, treasurer and attorney.

The aggregate development consists of three plants having a total capacity of approximately 150,000 hp.

Kettle Falls Plant to Be First Columbia River Project

The project of the Washington Water Power Company of Spokane, Wash., at Kettle Falls promises to be the first going hydroelectric project on the Columbia River proper. All plans have been completed to go forward with construction this summer. D. L. Huntington, the president of the company, conferred with officials of the Federal Power Commission last week in regard to the license to cover the project.

It is understood that J. L. Harper, the chief engineer of the Niagara Falls Power Company, has been engaged as a consulting engineer to assist in the preparation of the plans for the project.

The principal engineering problem involved is the construction of the spillway gates. On account of the restricted channel of the river and the depth of the water, the gates have to be as long as possible in order to avoid interfering with spillway capacity by the thickness of piers. Mr. Huntington has in mind the installation of gates 76 ft. long and has been visiting projects where the gates are of unusual length. It is believed, however, that there are no existing spillway gates of the length of those proposed for the Kettle Falls project.

Contract for power for driving the proposed Moffat Tunnel in Colorado, has not been let and will not be made until a decision of the courts permits the Moffat Tunnel Commission to start work on the tunnel. In the March 15, 1923, issue of the Journal of Electricity and Western Industry, it was stated that the Colorado Power Company of Denver, Colo., had been given the contract. This statement was in error, as at present the power company only serves the district adjacent to the proposed tunnel.

Members of the Boulder, Colo., Rotary Club were luncheon guests of the Western Light & Power Company recently. The meal was cooked entirely on electric stoves and was served in the Lafayette plant of the power company.

Electrically Cooked Meal Served to Boulder Rotary Club

That electricity will cook was clearly demonstrated recently to the Rotary Club of Boulder, Colo., when the weekly luncheon was set between the big turbines of the Western Light & Power Company at its Lafayette plant, twelve miles from Boulder. Seventy-five members were the guests of C. A. Semrad, general manager of the company, and all agreed that it was the most novel meeting ever featured by their club.

Three electric ranges were installed at the plant especially for the occasion by E. B. Ball, commercial manager, and M. E. Lanning of the Westinghouse Electric & Manufacturing Company in Denver. The latter did the cooking, starting the night before in order that oven space would be available immediately prior to serving the meal. Virginia baked hams in the quantity of 67 lb. proved the piece de resistance of the menu.

Plan to Have Mining Exposition in Salt Lake City, Utah

Plans are being laid for an international mining exposition to be held at Salt Lake City, Utah., during the fall of 1925. Preliminary plans for the exposition are in the hands of an exposition committee, of which H. S. Joseph is chairman, and H. C. Goodrich and C. C. Boswell are the other two members. The Salt Lake City chamber of commerce is strongly behind the project, and it also had the endorsement of the last Utah legislature.

Not only will the mineral resources of Utah be given publicity, but the exposition will be international in scope. As soon as practical the committee will work to have President Harding and Congress take favorable action on the plan. Later the interest of foreign nations will be enlisted.

Washington Utilities Men Discuss Securities Company

About 150 electric power and light men, representing the 247 cities and towns served by the Puget Sound Power & Light Company, were present at a convention held in the Henry Building in Seattle, Wash., recently. The purpose of the meeting was to discuss plans for the new Puget Sound Power & Light Securities Company. This latter company was recently organized to handle the stocks, bonds and other securities of the parent company.

The men in attendance were introduced to the officers of the North Coast Power Company and the Washington Coast Utilities Company, the companies which were recently taken over by the Puget Sound company. Speakers at the meeting included: A. W. Leonard, president of the Puget Sound Power & Light Company; W. H. McGrath, vice-president of the company; H. G. Gille, sales manager of the corporation; Frank Dabney, manager of the new securities company; F. W. Brownell, comptroller of the securities company, and Captain N. W. Brockett, tax agent of the Puget Sound Power & Light Company.

List of "Directors' Nominees" Is Announced by A.I.E.E.

At the meeting of the board of directors of the American Institute of Electrical Engineers held in New York, March 16, the report of the committee of tellers, on its canvass of the nomination ballots cast for candidates for the Institute offices falling vacant July 31, 1923, was presented.

As required by the constitution of the Institute, the board then selected by ballot its list of "Directors' Nominees," with the following result:

For president: Harris J. Ryan, Stanford University, Calif.

For vice-presidents: District No. 2 (Middle Eastern), William F. James, Philadelphia, Pa.; District No. 4 (Southern), H. E. Bussey, Atlanta, Ga.; District No. 6 (North Central), Herbert S. Sands, Denver, Colo.; District No. 8 (Pacific), J. E. Macdonald, Los Angeles, Calif.; District No. 10 (Canada), S. E. M. Henderson, Toronto, Ont.

For managers: H. P. Charlesworth, New York, Y. Y., William M. McConahey, Pittsburgh, Pa., W. K. Vanderpoel, Newark, N. J.

For treasurer: George A. Hamilton, Elizabeth, N. J.

The election ballots, including the names of the Directors' Nominees and all other eligible candidates, have been mailed to the membership.

Electragists' Representatives Will Tour Continent

At the executive committee meeting of the Association of Electragists, held in New York City March 14-15, it was decided that James R. Strong and Laurence W. Davis, president and director of promotion and development respectively, of that organization, should take a transcontinental trip during the coming summer. The object of the trip is to hold divisional meetings of the membership.

The two men will stop at divisional points and in some other cities, in order to allow contractor-dealer members of the organization to attend a meeting of the body. The executive committee of the association feels that all members should have the opportunity of attending at least one meeting a year, and the divisional meetings will in a way supplement the national one.

Tentative dates for the divisional meetings to be conducted by Messrs. Strong and Davis in the western states are as follows: Denver, Colo., July 16; Salt Lake City, Utah, July 18; Los Angeles, Calif., July 20; San Francisco, Calif., July 23; Portland, Ore., July 25; Seattle, Wash., July 26; and Vancouver, B. C., July 27.

Dates for the display of electrical homes in California under the direction of the California Electrical Cooperative Campaign have recently been set. The four different exhibits now definitely decided upon cover a period of two months. The dates are as follows: Fresno, April 12-29; San Francisco, May 3-19; San Diego, May 17-June 3; and Sacramento, May 31-June 16.

Hetch Hetchy dam on the Tuolumne River, which has just been completed, has been named O'Shaughnessy Dam after M. M. O'Shaughnessy, chief engineer of the City and County of San Francisco. The Board of Supervisors of that city, upon the recommendation of the San Francisco Chapter of the American Association of Engineers, adopted resolutions naming the dam after City Engineer O'Shaughnessy, who has had direct supervision over the construction of the project which will furnish water and power to the city.

Complete First Unit of General Electric Oakland Plant

The first unit of the General Electric Company's plant at Oakland, Calif., comprising a service shop and a switchboard and transformer factory, was completed during the past fortnight. The building is a steel and brick class "B" structure, 335 ft. long by 135 ft. wide, containing 45,000 sq. ft. of floor space.

The building is attracting much attention on account of the completeness of its electrical equipment and its high class lighting installation. It is equipped with a 5-ton electric crane and is protected against fire by a 50,000-gal. steel water tank. It is served by two transcontinental railroads.

A complete description of the new structure together with photographs will appear in a forthcoming issue of the Journal of Electricity and Western Industry.

New Member Appointed to Utah Utilities Commission

Thomas N. McKay, of Huntsville, Utah, has been appointed by Governor Mabey to succeed Judge Joshua Greenwood as a member of the Public Utilities Commission of Utah, Judge Greenwood's term having expired.

Mr. McKay, who has extensive farming interests in Utah, has taken a prominent part in public affairs for the past several years, and has been a member of the state senate for several terms. He was president of that body at its last session.

The Florence Electric Company, of Florence, Ore., has recently decided to erect a power plant on Sweet Creek. Extensions of transmission lines to Mapelton, up the north fork of Sweet Creek, are also planned by the company.

Pacific Coast Convention Plans Have Been Announced

Plans for the Seventh Annual Convention of the Pacific Coast Electrical Association, to be held in San Francisco, June 19-23, have been rapidly put into shape. The committees in charge of arrangements, have recently announced a program for the days of the convention.

The opening day, June 19, will be devoted to registration, and in the evening moving pictures arranged for by the publicity committee, will be presented to the visitors. The formal opening of the convention will take place on the morning of June 20, at which time James B. Black will give the President's Address. Technical and Commercial Section meetings will be held that afternoon and informal dancing and entertainment will be provided for the evening.

Technical and Commercial Section meetings will be continued on the morning of June 21 and the afternoon will be devoted to golfing. The Second Business Session will be held on the next morning and the Western Conference is scheduled for the afternoon of June 22, with the banquet following that evening. On Saturday the convention delegates will take the trip up Mount Tamalpais, and into Muir Woods. Those who desire to do so may stay overnight on the summit of the mountain. This trip will close the convention.

The Puget Sound Power & Light Company and the Pacific Northwest Traction Company will spend a total of $425,000 this year in extensions and improvements in Whatcom and Skagit Counties, all of which is for the purpose of giving increased and improved service.

Architect's drawing of proposed $3,000,000 Olympic Hotel, which will be built in Seattle, Wash., from funds raised by popular subscription. George B. Post & Sons, New York, prepared the plans, represented by Bebb & Gould in Seattle. The building will be 12 stories high, containing 650 rooms, each with bath attached. A huge roof garden, dining room with capacity of 400 diners, grill room accommodating 200 and coffee shop with room for 500 guests, are features of the proposed structure. The first four floors of the building will be of steel, and the remaining of reinforced concrete. Work of wrecking the present buildings on the site at Fifth Avenue and Seneca Street, is under way, and contract for excavating will be let immediately.

Utah Power & Light Company Is Adding Rural Customers

The Utah Power & Light Company, during the past fall, completed the construction of a 44,000-volt transmission line from Menan to St. Anthony, Idaho, and the transmission line which this new construction replaced is now being operated at 11,000 volts for distribution purposes. Energy for this service is obtained from substations at Menan and Rexburg.

This 11,000-volt line is available for service to residences and communities adjacent to or near it, and lines have recently been extended to Burton, where about forty-five new customers are obtaining electric service.

Books and Bulletins

ENGINEERING ECONOMICS

By JOHN C. L. FISH, professor of railroad engineering, Leland Stanford University. 311 pages. 6 by 9 in. Illustrated. $3. Published by McGraw-Hill Book Company, Inc., New York.

This is the second edition of this book on the application of economics to engineering, the first edition being published in 1915. The author believes that engineering knowledge can be converted into community service only through the medium of business and consequently the engineer's contribution to public welfare depends largely on his understanding of the business side of engineering.

The text covers the subjects of analysis of problems of investment, interest and time value of money, practical analysis of first cost, business units, business statistics, valuation, engineering reports and miscellaneous reports.

The question of economics in general is one that is now attracting considerable attention and it is quite appropriate that economics as applied to engineering should be given an impetus at this time.

The author is to be commended on the thorough and painstaking effort shown in this book. Wherever necessary he has made use of mathematics in illustrating a law,—the chapters on interest and valuation being particularly good examples of this method of treatment.

In this second edition certain changes in the mechanical features of the book have been introduced. Chapter I begins with section 101, Chapter II with section 201, and so on, and each table, equation, and figure is designated by the number of section in which it makes its first appearance. This method is no doubt of value in class room work, but its usefulness in a reference book is questionable as it may be somewhat confusing.

About eighty pages of the text are devoted to an appendix which is divided into four sections, Appendix B consisting of tables of formulas and values is particularly valuable, while Appendix D consists of a good collection of questions and problems.

As a text for class room work and as a reference book for practicing engineers, a book of this nature should have a wide field of usefulness.

E. R. S.

Meetings

Contractor-Dealers to Discuss Technical Subjects

At a recent meeting of the Electrical Contractors and Dealers' Association of San Francisco, it was decided that it would be for the good of the organization to devote a part of the time at the weekly luncheons of the Association to the discussion by the members of technical electrical subjects. The members present suggested that certain men were particularly well fitted to give advice on certain phases of wiring standards and that consequently these men could and should give this definite information to the entire membership.

A suggestion was also made that the Association have prepared a set of blueprints, showing typical installations that are correct in San Francisco. It was the opinion of the organization that information on mechanical details of electrical installations could be better portrayed by means of diagrams than in any other way. This matter was later referred to the standardization committee of the organization.

In a talk presented by Ray Brouillet, the sales manager of the Anderson Smith Company, automobile dealers in the city, the electrical men were urged to practise creative selling. Mr. Brouillet, formerly a wiring contractor, told the contractor-dealers that they were not getting the most out of their business, if when they completed an installation they did not go to the owner of the building and sell him appliances to be used in connection with the wiring installed.

The Association members decided to have a speaker from outside of the organization address them on the last Thursday of each month. When speakers are invited to attend, the meetings will be considered to be open.

San Diego Electric Club Makes Plans for Home Display

Details concerning the electrical home to be displayed in San Diego, Calif., May 17-June 3, were discussed at the evening meeting of the Electric Club of San Diego, on March 27. The organization is endeavoring to cooperate with the California Electrical Cooperative Campaign in every way possible so that the two may present one of the most successful electrical homes that has been shown the public so far.

Walter Wurfel, former president of the club, presided at the meeting and before introducing Frank Smith, Los Angeles representative of the California Electrical Cooperative Campaign, gave the men some of the ideas of the committees in charge. During the meeting, A. E. Holloway, superintendent of the commercial department of the San Diego Consolidated Gas & Electric Company, made assignments of privileges as to appliances and other exhibits. These rulings were made in the meetings of the committee on exhibits.

Furniture men of the city told the electrical men of the part that they intended to play in exhibiting the home. The meeting was then thrown open to general discussion and various members spoke from the floor concerning the home.

Engineers Regional Meeting to Be Held in Los Angeles

The opening sessions of the Pacific Coast Section of the American Society of Mechanical Engineers to be held in Los Angeles, Calif., April 16, will be devoted to technical subjects, according to announcements of the committee on arrangements. Illustrated addresses on the hydroelectric development of California will be presented to the engineers. The second day will be devoted to automobile trips of inspection, the tour to include the California Institute of Technology and the laboratory of the Mount Wilson solar observatory, where the night will be spent. The final day, April 18, will be spent in a tour of the oil fields of southern California.

Among the officers and past officers of the society to be present are: John L. Harrington, Kansas City, president of the society; Dr. Ira N. Hollis, Worcester, Mass., past president; and Calvin W. Rice, New York City, secretary of the organization.

Washington Power Line Is to Be Extended to Orchard District

The Washington Water Power Company has an extension of its Central Washington transmission line under construction to reach Quincy, in the heart of the famous Quincy Flats. It will carry power for use in pumping largely, that being the only method of irrigation in use there. The extension will be about 20 miles in length and will serve Winchester and Quincy and the adjacent orchard tracts and farms.

COMING EVENTS

Radio and Electrical Exposition—
Civic Auditorium—San Francisco, Calif
April 3-8, 1923

American Society of Mechanical Engineers—
Pac. Coast Regional Meeting—Los Angeles, Calif.
Apr. 16-18, 1923

Southwestern Public Service Association—
Annual Convention—Fort Worth, Tex.
May 15-17, 1923

National Electric Light Association—
Annual Convention—New York, N. Y.
June 4-8, 1923

Pacific Coast Electrical Association—
Annual Convention—San Francisco, Calif.
June 19-22, 1923

Northwest Electric Light and Power Association
Annual Convention—Seattle, Wash.
June 27-30, 1923

American Institute of Electrical Engineers—
Pacific Coast Convention—Del Monte, Calif.
Sept. 26-29, 1923

Hearings for the purpose of obtaining the views of California interests on the proposed consolidation of railroads to be held by the Interstate Commerce Commission will be conducted in San Francisco on April 2, and in Los Angeles on April 7. The hearings were originally scheduled for March 31 and April 7, respectively.

Contractor-Dealers to Meet at Donner Lake in June

Donner Lake, in the Lake Tahoe region of California, has been chosen as the site for the annual meeting of the California State Association of Contractors and Dealers. The meeting will be held there June 9-16 and during the week plans call for all kinds of entertainment for the assembled electrical men and their wives and children.

The resort is essentially a camp, and the men and their families in attendance at the meeting will live in well constructed tent-houses. It is the plan of the committee in charge to make the week a summer vacation outing for the members of the association and in this way allow them to combine business and pleasure.

The plans as formulated, call for a motor caravan starting from San Francisco on June 9 and being joined by the Sacramento, Stockton and San Joaquin Valley contingent at Sacramento. Other delegates will motor direct to the lake. Full details have not been determined upon yet, but members will be advised in time to permit them to make all arrangements.

The committee in charge of the meeting has secured the exclusive use of the resort for the contractors and dealers for the week and has also provided for special rates for the convention visitors. Meals may be secured at the main dining hall or families wishing to do so may do their own housekeeping.

Committees for San Francisco League Are Appointed

Standing committees for the year 1923 for the San Francisco Electrical Development League were recently appointed by Louis F. Leurey, the newly elected president of the organization. The new committees have already taken up their duties and will be responsible for the work assigned to each during the remainder of the year.

The members of the electrical industry in San Francisco that have been appointed on the committees are as follows:

Public Relations Committee: W. S. Berry, chairman; A. H. Elliot, Garnett Young, F. A. Leach, Jr., C. L. Chamblin, R. A. Hudson, E. O. Shreve.

Program and Educational Committee: C. B. Kenney, chairman; L. J. Brown, A. E. Rowe, Francis Watts, James Redpath, Jack Stewart, A. H. Elliot, Louis Levy, M. H. Schnapp, M. W. Scanlon, W. W. Hicks, Ralph DuVal.

Central Bureau of San Francisco Organizations: R. A. Balzari, chairman; C. L. Chamblin.

Fraternal and Attendance Committee: Jack Hassett, chairman; George Curtiss, G. W. Barker, M. H. Jones, M. S. Barnes, R. E. Martinez.

Membership Committee: R. F. McDonald, chairman; H. N. Nelson, Arthur Dahl, W. B. Francis, Charles Langlais, Edward Nelson, Walter Sultan, William Tardif, G. D. F. Smith, Willard Johnson.

Publicity Committee: E. C. Portman, Jr., chairman; M. W. Scanlon.

Finance Committee: F. J. Cram, chairman; James Lavenson, E. C. Kinsey.

Properties Committee: Henry Bosch, Jr., chairman; H. F. Yost, V. W. Hartley.

Historical Committee: C. A. Loring, chairman; S. H. Taylor, Henry Bostwick.

Technical Committee: H. W. Crozier, chairman; C. W. Mitchell, R. W. Wiley, G. E. Kimball, W. L. Winter, F. O. Sievers, E. W. Stone, C. F. Henderson, F. R. George, A. H. Nicoll, G. H. Hagar, V. D. Cousins

The Public Utilities Commission of Utah has dismissed the application of Cedar City, Iron County, for an order authorizing the construction of a municipal lighting plant.

Personals

Perry O. Crawford, chief engineer of The California Oregon Power Company, has been named vice-president and chief engineer of the company. Mr. Crawford was born in Malvern, Ohio, and received a degree of A.B. in electrical

PERRY O. CRAWFORD

engineering from Stanford University in 1908. From 1908 to 1911 he was construction engineer with the Northern California Power Company and built the South, Inskip and Coleman power houses for that company. In 1912 he went to Afghanistan as assistant engineer on government hydroelectric work and for three years was in charge of work on the Jabl-us-siraj plant. After returning to the United States he spent six months at Stanford in research work under Professor Harris J. Ryan. Mr. Crawford has been with The California Oregon Power Power Company since 1916, having been chief engineer since 1918. He has had charge of all engineering activities of the company since his affiliation with it, including the construction of the Copco Dam and both units of the Copco Power House.

William Hubert Burr, noted civil engineer whose home is in New Canaan, Conn., recently inspected the site of the proposed bridge across San Francisco Bay at Carquinez Straits. Mr. Burr was formerly professor of civil engineering at Rensselaer Polytechnic Institute and Harvard University. For a time he was consulting engineer for both the state and city of New York.

Edwin L. Andrew has been appointed assistant to the manager of the department of publicity of the Westinghouse Electric & Manufacturing Company with headquarters in East Pittsburgh. It will be remembered that Mr. Andrew was a recent Pacific Coast visitor.

Francis C. Shenehon has been made vice-president and general manager of construction and engineering of the Byllesby Engineering and Management Corporation. Mr. Shenehon is a widely known hydraulic engineer and was for a number of years dean of the college of engineering and architecture of the University of Minnesota.

H. T. Dyett, president of the Rome Wire Company, Rome, N. Y., accompanied by **J. G. Pomeroy**, western representative of the company, with headquarters in Los Angeles, is a recent San Francisco visitor.

J. F. Johnston, who for the past three years has been a member of the engineering department of The California Oregon Power Company, has joined the drafting department of the Portland Railway, Light & Power Company.

E. A. Carter, Salt Lake City representative of the Eureka Vacuum Cleaner Company, has returned to his headquarters after attending the national sales convention of that company in Detroit.

Harry P. Rees, instructor in electrical engineering, San Pedro High School, and **George E. Springer**, instructor of electrical engineering, Manual Arts High School, were the chief speakers before a recent meeting of the Los Angeles Electric Club. Both men told the members of the organization of the work which is being done in their respective schools in the electrical departments.

Lewis Degen, consulting electrical signal engineer of Berkeley, Calif., has been retained by the City of Los Angeles to supervise the installation of a $1,500,000 fire alarm system. Mr. Degen has spent many years in South America, installing the first electric street railway on that continent in Rio de Janeiro in 1890 and later acting as consulting signal engineer for the Brazilian government for eight years. During this time he installed what was then the largest police and fire alarm system in the world at Rio de Janairo. He returned to the United States in 1913 and in 1914 prepared plans for a new fire alarm system for Los Angeles.

Kenneth V. Laird has been placed in charge of the newly organized transmission and street lighting department of the Capital Electric Company, jobbers, of Salt Lake City. Mr. Laird is a graduate of the University of California with the class of 1914. Prior to the war he was a member of the engineering staff of the Anaconda Copper Mining Company and more recently he has been acting as electrical engineer for the Gillert Engineering Company of Philadelphia.

R. P. Tracy of Manning Bowman Company, manufacturers of heating devices, New Britain, Conn., is a recent California visitor.

Paul P. Ashworth, distribution engineer of the Utah Power & Light Company, has been unanimously re-elected to represent the Utah section of the American Institute of Electrical Engineers on the governing board of the Engineering Council of Utah. His term of office will expire Jan. 1, 1925.

O. J. Kelvey, formerly street lighting specialist of the General Electric Company's Buffalo office, has just recently joined the Los Angeles office of that organization and will have charge of street lighting equipment sales.

Elbert Kramer, heating specialist in the San Francisco office of the Westinghouse Electric & Manufacturing Company, has severed his connection with that company to become associated with Landers, Frary & Clark in the exploitation of that organization's merchandising lines in the Los Angeles territory.

J. F. Dostal, manager of the Colorado Springs Light, Heat & Power Company and president of the Rocky Mountain Division of the N.E.L.A., attended the national executive committee meeting of that organization in Chicago, on March 22.

A. H. Seep, one of the officials of the Mine & Smelter Supply Company, is taking an active interest in the construction of the new buildings at Regis College in Denver.

D. C. McClure, electrical superintendent of the Denver Gas & Electric Light Company, has returned from an extended trip to New York in the interest of the new power plant which will be built by the Doherty interests near Boulder, Colo.

C. C. Burt, of Salt Lake City, Utah, has been elected delegate to the national convention of the American Association of Engineers, to be held at Norfolk, Va., in May, by the Salt Lake City chapter of the association. **H. S. Kleinschmidt** was named alternate.

Clare N. Stannard, **George W. Bixler**, and **F. F. McCammon** of the Denver Gas & Electric Light Company; **Ben S. Read** of the Mountain States Telephone & Telegraph Company; **L. M. Cargo** of the Westinghouse Electric & Manufacturing Company; **E. C. Stenger**, receiver of the Denver Tramway Company, and **D. D. Sturgeon**, Denver electragist, are on the committee of 200 headed by Mayor D. C. Bailey of Denver, Colo., which is to be in charge of the Pageant of Progress to be held in that city in July.

Lester S. Ready, formerly assistant chief engineer of the California Railroad Commission, has been appointed chief engineer, succeeding Richard Sachse, resigned. Mr. Ready is a graduate mechanical engineer of the University of California and was a gold medal student in the class of 1912. Following his graduation he spent a year in the distribution department of the Pacific Gas & Electric Company and since 1913 has been with the Railroad Commission. For five years he held the position of gas and electrical engineer and in 1919 he was made assistant chief engineer, which position he held

LESTER S. READY

at the time of his recent appointment. A. V. Guillou, who has been assistant engineer in the gas and electric division for the last three years, has been named gas and electrical engineer in charge of the division, succeeding Mr. Ready.

F. E. Boyd, manager of the motor department in the San Francisco office of the General Electric Company, recently left for New York City, where he will spend some time in the interests of his company.

J. J. Canavan of Los Angeles and San Francisco was a recent Portland, Ore., visitor. Mr. Canavan plans to open a branch office in Portland for the sale of Walker Electric Trucks.

S. W. Bishop, executive manager of the Denver Electrical Cooperative League, was the chief speaker on the radio broadcasting program of the Winner Corp., in that city, March 7.

E. C. Headrick, past chairman of the Electrical Cooperative League in Denver, Colo., attended the national executive meeting of the Association of Electragists' International in New York City, March 14-15, as the representative of the mountain division.

George O. Queen, for many years connected with the Gillespie-Eden Corporation and more recently in charge of that company's Pacific Coast service, has taken up similar duties with Landers, Frary & Clark with headquarters in the Call Building, San Francisco.

N. C. Harvey, of the Illinois Electric Company of Chicago, who has been spending the winter season in Los Angeles and Pasadena, has just recently returned to his Chicago home.

R. S. Rubincam has been appointed local manager of the Mine & Smelter Supply Company in Denver, Colo., to succeed **S. M. L. McSpadden** who resigned.

F. F. Miller, an old time Denver contractor, is the latest addition to the membership ranks of the Electrical Cooperative League in that city.

George H. Curtiss, for the past five years sales manager of the Electric Railway & Manufacturers Supply Company of San Francisco, in company with **Rosse M. Gilson,** has organized an independent electrical supply jobbing business to be known as the Universal Electric Company, with headquarters at 137 Sixth St., San Francisco. Mr. Curtiss has been identified with the electrical industry for more than 25 years. He began his career in the industry as a repair man and later entered the contracting business. He was for some time connected with the sales department of the Pacific States Electric

GEORGE H. CURTISS

Company and later joined the "Ermsco" organization. Mr. Curtiss is an active figure in the electrical industry, having taken an active part in all conventions and in the affairs of the San Francisco Electrical Development League.

C. E. Groesbeck, formerly vice-president and general manager of the Utah Power & Light Company, and now vice-president of the Electric Bond & Share Company of New York, was a Salt Lake City visitor during the latter part of March. Mr. Groesbeck, who is accompanied by Mrs. Groesbeck, continued on to the Pacific Coast on a vacation trip. While in Salt Lake City he conferred with officials of the Utah Power & Light Company.

C. Melville Dollar has been elected chairman of the Shipping Bureau of the Vancouver Board of Trade.

Jack West of the sales department of the Denver Gas & Electric Light Company has been placed in charge of the sales floor of the company.

R. W. Goddard, dean of engineering at the New Mexico College of Agriculture and Mining, recently spoke before the Albuquerque section of the American Association of Engineers on the proposed bill to license engineers which is before the New Mexico State Legislature.

Edmund Lang, vice-president of the Crocker-Wheeler Company, Ampere, New Jersey, is a recent San Francisco visitor. Mr. Lang came from New York with a party of friends through the Panama Canal in a private yacht.

Stacy Hamilton, assistant to the president, Portland Railway, Light & Power Company, is a recent San Francisco visitor.

T. W. Ness, sales manager of the Holtzer-Cabot Electric Company of Boston, Mass., is visiting the Pacific Coast at the present time.

Hoyt Catlin, advertising manager of the Bryant Electric Company, Bridgeport, Conn., is a recent Pacific Coast visitor.

Dean D. Clark, Denver commercial manager of the Mountain States Telephone & Telegraph Company, has been appointed a member of the Advisory Board of the Electrical Cooperative League in that city.

F. J. McEniry, field representative of the Electrical Cooperative League, and **George E. Lewis** of the Rocky Mountain Committee on Public Utility Information, were the speakers at the weekly radio matinee of the league in Denver, March 15.

Robert Treat, engineer of the lighting department of the General Electric Company with headquarters in Schenectady, has been spending considerable time on the Pacific Coast in the interests of his company.

J. H. Knost, branch manager of the Tucson office, Westinghouse Electric & Manufacturing Company, and **Walter G. Willson** of the same office, recently spent several days in Los Angeles completing arrangements of large orders which they have secured in the mining districts of Arizona.

E. B. Whipple, manager of the Whipple Electric Company, Provo, Utah, has been elected exalted ruler of the Provo lodge of Elks.

W. C. Sears, Pacific Coast representative of Landers, Frary & Clark, has just concluded an extended visit in Los Angeles and southern California, going over the local territory with the company's representatives in this section.

S. P. Russell, of H. B. Squires Company of San Francisco, was a recent Los Angeles visitor.

Charles Heston Pierson, supervisor of publicity of the Southern California Edison Company, recently celebrated his fiftieth anniversary as a writer for American newspapers. "Charlie" started his newspaper work as a reporter for the Progressive Batavia, the local paper in the western New York town in which he was born, during his twelfth year. After varying experiences as telegraph operator, train despatcher and correspondent for metropolitan papers he joined the staff of the Buffalo Times, then a struggling morning paper, owned

CHARLES HESTON PIERSON

by Norman E. Mack, now one of the big political leaders of America. For many years, subsequently, he was connected with the Associated Press as a member of its Albany and Washington staffs and as night city editor at the main office, corner of Dye Street and Broadway, New York, which at that time was considered the center of news of the western hemisphere. Coming to California in 1900 as Pacific Coast press agent for the Pan-American Exposition, "Charlie," after the fashion of other legions before and after him, became enamored of southern California. The old Morning Herald introduced him to his first California newspaper audience in 1903. For several years thereafter he was identified with the Hearst papers until 1908, when he was appointed publicity director for the Southern California Edison Company, in which service he still continues.

R. D. Walker, president of the Walker & Pratt Manufacturing Company, has returned to Boston after spending several weeks in various Pacific Coast cities.

C. E. Pillars and **R. H. Hamel** have been appointed as inspectors in the city electrical department by Mayor Dewey C. Bailey of Denver.

R. F. Del Valle has been re-elected president of the Los Angeles Board of Public Service Commissioners. Mr. Del Valle is beginning his fifteenth year as head of the board which supervises the operations of the city's water, power and light systems.

E. M. Cutting, formerly western representative of the Edison Storage Battery Company, has joined the sales department of the Atlantic-Pacific Radio Supplies Company. Mr. Cutting is well known to the electrical industry of the West. He was one of the first presidents of the San Francisco Electrical Development League.

Manufacturer, Dealer and Jobber Activities

The H. M. Thomas Company has recently been appointed California representative for the Pure Carbon Company, Wellsville, N. Y. The Thomas company has offices in the Oakland Bank Building, Oakland, Calif., and in the Title Insurance Building, Los Angeles, Calif.

The Electric Novelty Works has moved from 533 Mission Street, San Francisco, to 965 Howard Street, in the same city. V. Sollman is proprietor of this firm which manufactures electrical connections.

The Robbins & Myers Company, of Springfield, Ohio, manufacturers of all types of electric motors, generators and fans, has announced the appointment of H. H. Beck as its advertising manager. Mr. Beck came to the Robbins & Myers Company from Erwin, Wasey & Company, Chicago advertising agents, with whom he has been associated for the past few years. His connection with the Robbins & Myers Company became effective on March 1.

The Dryer Electric Company, a contractor-dealer firm of Glendale, Ariz., has recently moved into larger quarters in the business district of the Arizona town. The company plans to carry a new and large stock of electric fixtures in order to serve the towns of Glendale, Peoria and Scottsdale. The firm also installs power plants on farms in the vicinity.

The General Electric Company has recently published Bulletin No. 46,053 which is devoted to a description of its portable timing device. This piece of equipment consists of an encased clock, to be used with a standardized clock as a means of secondary timing, to supplant the stop watch. The device has applications which enable its use with graphic instruments.

The Standard Electrical Repair Company has recently moved from Burlingame, Calif., to 3478 Mission Street, San Francisco. H. Schade is proprietor of the firm which does electrical repair work.

S. Robert Schwartz & Brother, of New York City, manufacturers of Esrobert portable lamps, have recently placed on the market a new lamp which combines a number of new features. The lamp is known as the Q-Ray therapeutic lamp. The lamp is fitted with a shade which produces parallel rays, thus avoiding the danger of burns due to the focusing of heat at one point.

The Crooks-Nathan Household Appliance Company of Denver, Colo., has recently moved from 1648 California Street to the Commonwealth Building.

The Hindes Electrical Company, of Loveland, Ohio, recently fitted up a small automobile to be used by salesmen demonstrating small home lighting plants. The automobile has been converted into a moving store and enables the salesman to display the power plant on the farmer's own ground.

The City Electric Company, Tacoma, Wash., has moved to new quarters at 11 South 11th Street. T. J. O'Keef is manager of the company.

The Killark Electric Manufacturing Company, of St. Louis, Mo., is placing on the market a new bell-ringing transformer, which has been designed to take up minimum space so that it will fit in a standard box. The transformer is designed to be used on 110-volt, 60-cycle alternating current circuits and delivers eight volts on the secondary.

The Leo J. Meyburg Company, of San Francisco, has recently moved from 428 Market Street, to 973 Mission Street.

The Power-Brown Electric Company, Spokane, Wash., recently received contract for installing all the wiring, electric equipment and fixtures in the new Chelan County courthouse, on a bid of $11,694.

By using the newly developed electrical Inktomiter, manufactured by the Hootenany Calibrating Company, of ZaZaxaville, Guatemala, the photographer was able to obtain the highly valuable picture reproduced above. W. E. Andrews, San Joaquin Valley representative of the Alexander & Lavenson Electrical Supply Company, was chosen the subject for the trial of the Inktomiter. "Bill" was particularly anxious to have the test made for he wanted to see if the device would really record what he was thinking about. The answer to his question will be left to the reader. Bill had the picture taken just after he purchased a new putter and a dozen golf balls in a San Francisco store.

The Electric Shop of D. C. Bacon is the newest electrical store in Phoenix, Ariz. D. C. Bacon, the owner, has been in the electrical contracting and dealing business in Phoenix for a number of years, having been associated with L. J. Bohn in the Arizona Electric Company there.

The Highland Park Electric Shop, of Los Angeles, Calif., has recently moved into a new and larger store at 5903 Pasadena Avenue. George L. Barnes is proprietor of the establishment.

The P. A. Geier Company, of Cleveland, Ohio, has recently announced a spring house cleaning sales contest open to retail salesmen. Prizes of cash or merchandise will be given to the leaders and others who qualify with a reasonable number of sales. The contest extends from April 2 to June 2.

The Ohio Electric & Controller Company, Cleveland, Ohio, has placed on the market a motor-generator set which is suitable for home charging of radio and automobile batteries, at any desired rate from one to twenty amperes. An ammeter and rheostat are provided to permit the battery owner to regulate the charging rate. The new set is claimed by the manufacturers to be nearly noiseless.

The Hardin Light & Power Company, of Hardin, Mont., has recently moved to the Sullivan Building in the Montana town. The new store will give the company more space for keeping electrical supplies, and also room for the repair department conducted.

The Hurley Machine Company, of Chicago, Ill., has recently placed on the market a new line of electric washing machines, to supplement the Thor line. The new models will be known as the Superior line and will retail at prices below the Thor models. The new line includes washers of the oscillating type, vacuum cup type and a complete group of single and double wood and copper tub dolly type washers.

The South Pasadena Electric Shop has recently been opened by C. M. Jeffries to do a general electrical contracting and dealing business in South Pasadena, Calif. The new store is located at 1615 Mission Street in the southern city.

The Uehling Instrument Company, Paterson, N. J., manufacturer of CO_2 recorders and other power plant gages, has placed Charles J. Schmid in charge of sales in Greater New York and Long Island. Mr. Schmid is well qualified for his duties in that territory due to his close contact with power plant operators in the interest of fuel economy when formerly in charge of the Boston office.

The Willard Electric Company is a new electric shop opened by E. Willard at 112 East Winston Street, Los Angeles, Calif.

The Cutler-Hammer Manufacturing Company, of Milwaukee, Wis., has recently completed installation of a C-H magnetic clutch which is attached to a 300-hp. synchronous motor in the establishment of the National Elevator Company of South Chicago, Ill. The motor replaces the steam equipment of the company and permits a saving of about $8,000 a year.

The Square D Company, Detroit, Mich., has recently put on the market a new antenna insulator of porcelain, finished in dark brown glaze. The insulator has a tensile strength of 350 lb.

The Bell Novelty & Electric Shop, an electrical contractor-dealer firm of Bell, Calif., has recently been purchased by R. L. Linn, of that place. Mr. Linn was formerly interested in the company and has now obtained sole ownership.

Eddings & Gill, a contractor-dealer organization of Glendale, Calif., has recently opened a new place of business at 450 Los Felis Boulevard, in the southern California town.

C. E. Ingalls, of San Francisco, Calif., has recently been appointed representative of the Copper Clad Steel Company of Braddock, Pa., to have the states of California, Arizona, and Nevada. Mr. Ingalls' office is in the Rialto Building.

Trade Outlook

San Francisco

Business conditions in the territory surrounding San Francisco and in the city itself are showing tendencies to advance rapidly. Manufacturing industries are noticing an increase and there is no evidence of a buyer's strike. The rise in commodity prices has been felt only slightly and purchasers are keeping up their demands. Demands for the principal raw materials produced in the Twelfth Federal Reserve District, of which San Francisco is the center, continued greater or in excess of supply in every case except agricultural products.

Real estate is active and the continued warm spring weather has brought an increase in building. Development in the rural districts is also being made, due to favorable weather conditions in the first part of March. The continued dry spell, which extended through March, has been hard on farmers who are in need of rain, as many sections are suffering from the lack of the usual amount of moisture.

Equipment companies have large orders on their books and railroads are making good showings, the recent rate reductions on west-bound freight aiding them in their efforts to secure more cars for California's eastward shipments.

Credit demands upon the Twelfth District Federal Reserve Bank and its branches reflected, to a limited extent, the increasing volume of production and trade. Commercial loans on March 7 of 66 reporting banks in the district show an increase of $20,000,000 over the same date of the previous month. The Federal Reserve Bank recently advanced its discount rate from 4 to 4½ per cent.

Portland

Business conditions generally continue to hold up well. Despite unfavorable weather during the first two months of this year the building permits and electrical permits showed a healthy gain over 1922. During the most of March the weather has favored construction and it is expected that March records will show a further gain.

The lumber business is in a very strong position. Mills are selling their output without effort and are maintaining prices. Several large bond issues have been successfully floated by lumber companies, indicating confidence in their future. Lumber production continues 15 to 20 per cent above normal with good strong demand for all grades. New business has been 7 per cent above production and shipments 7 per cent above new business. Ready built houses are more in demand than ever.

Electrical jobbers report shortage in some of the important lines—notably conduit. Orders for copper wire have been unusually heavy due to rising prices. The volume of business continues good.

Power companies through the state have started on another busy year of expansion with every company undertaking important developments.

Salt Lake City

One of the best indications of the return of better business conditions in the intermountain section is the manner in which the mining industry is thriving. The local settlement price of lead is the higest since the peak prices which prevailed during the world war. The price of copper is the highest for local settlement since the break in price during 1920.

Practically all of the metal mines in this section have announced a general wage increase for all mine and mill employees of from 7½ cents to 15 cents per day, with a maximum of 50 cents per day. The increase became effective March 16, and is a result of the increase in the prices of metals.

Electrical dealers devoted a great deal of intensive advertising and sales work to the sale of washing machines during the month of March, with considerable success.

With the opening of spring, building activity is expected to be greater than for many years past.

Merchants in some lines report present business not as good as it should be, but are looking forward to a much better year than last. The general trend is decidedly encouraging.

Los Angeles

Building activities in Los Angeles took a decided spurt during the first half of March and at the present rate the total for the month will run considerably in excess of $15,000,000. For approximately the first half of the month the city building department issued 2,372 permits with an estimated valuation of $9,924,547 while for the corresponding period of the previous month the number of permits issued was 1,802 and the estimated valuation $5,135,136. This month will be a record month, breaking all construction records in the city's history. Up to March 20 approximately $37,000,000 was invested in new construction since the beginning of the year.

Income tax receipts at the local office from January 1 to March 15, inclusive, were $7,795,632.42 this year, as against $4,589,518.65 during the same period of 1922. This shows a gain for the first three months of this year of $3,206,115, compared with the gain in the entire nation of approximately $7,000,000. For the returns filed March 15 of this year the tax paid by the people in the Los Angeles district will total approximately $10,000,000, according to the Collector of Internal Revenue.

The local retail trade which experienced a slight slump during the last few days of February and the first few days of March seems to be back to normal, as retailers of electrical goods report very favorable conditions for this season of the year.

Electrical supplies and lamps continue to be big sellers, this no doubt being due to the tremendous building activity that is in progress both in Los Angeles and southern California.

Denver

Although Colorado missed the severe storms which swept the middle west early in March, several near blizzards followed in such extreme fashion that considerable damage resulted to transmission lines of nearly all public service companies in the state. Traffic was materially delayed but railroads report that total tonnage and car loadings for March were the highest in almost a year.

Weather conditions have, of course, delayed outside construction but the building program as a whole has not slumped yet although marked wage increases for building craftsmen effective this month is an added factor of discouragement in the construction of many small homes. With recent advances on copper and steel, prices on electrical work are climbing but not in the degree warranted owing to competitive conditions between contractors.

Old-time optimism is not found in the banks although those in the larger cities all show greater deposits. Loans are being made conservatively. Collections in some lines are fair but on the whole are considered slow. Post office receipts show a 15 per cent increase over the same period in 1922.

Seattle

Marked improvement in the Seattle retail trade was apparent during the last two weeks, and it is believed this indicates a good volume of business during the spring and summer. February, although a short month, and visited with stormy weather, made an excellent showing in retail trade, and March sales volume is expected to run 15 per cent in advance of March of last year. Requests for credit have been granted in larger volume during the last week than for some time. This is interpreted to show a better purchasing position of the public, and a renewed confidence in price stability. Collections are showing gradual improvement, although not entirely satisfactory as yet.

Building of all kinds took a decided leap in February over that of January, particularly in the matter of residence and apartment construction. Contractors and builders in Seattle predict that the greatest increase in building, however, during the year will be in business, industrial and public buildings, as the need for the first two classes of construction is pressing.

Lumber production is well above normal, and new business is pouring into Northwest mills. Many dealers and manufacturers report sales approximate closely their productive capacity.

The annual car shortage is again forecast, and efforts are being made by the State Department of Public Works to forestall this menace. Eastern railroads are not returning empty cars to the western lines, and unless this can be remedied immediately, a serious shortage may occur in the Northwest.

Construction News

Bridges

Calif., Martinez—The board of supervisors has given notice of intention to grant a franchise to the Delta Bridge Corporation for the construction of a steel drawbridge across the San Joaquin River, 3 miles east of Antioch. The proposed bridge will be 3,675 ft. in length and will be erected at a cost of $600,000.

Ore., Portland — A contract was recently signed by the county commissioners retaining Robert E. Kremers of Portland and Ira G. Hedrick of Kansas City as engineers for the Ross Island and Burnside bridges. Bonds totaling $4,600,000 were voted at the November election to cover the cost of both bridges. The Burnside bridge bonds were set at $3,000,000 and the Ross Island bridge bond issue at $1,600,000. The engineers' fee will not exceed $180,000 for which they agree to furnish all engineering work including preliminary surveys, war department plans, inspections at the mills and at the sites and the supervision of all borings and soundings. Mr. Kremers was until recently chief of the Bureau of Construction and assistant to the city engineer. The Portland Chamber of Commerce and various civic bodies and organizations are insisting that a very thorough study be made of the entire bridge problem so as to obtain bridges having a maximum usefulness to the city. It has also been urged that competent architectural advice be obtained to insure that the proper attention be paid to the artistic side of the problem. It is not expected that actual construction contracts will be awarded before next January.

Utah, Salt Lake City—Kroft & Bundy were awarded contract recently for a bridge on the Salt Lake-Zion national park highway over Coal Creek, within the city limits of Cedar City. Nine bids were received, the lowest being $26,589.94.

Wash., Seattle—Col. E. L. Schulz, chief of the U. S. Engineers, has approved preliminary plans submitted by County Engineer T. R. Beeman for a proposed bridge to span the Narrows of Lake Washington, and final plans will be forwarded to Washington immediately for approval. The structure will have a 40-ft. clearance, and will cost approximately $30,000.

Dams

Calif., Oroville—The Oroville-Wyandotte Irridation District has issued a call for bids for the construction of a dam on Lost Creek. Bids are to be openeded on April 13. Plans for the dam were prepared by S. J. Norris of Oroville. The dam is to be completed by Dec. 1.

Highways

Calif., Santa Barbara—A. B. Cook, Santa Barbara, was awarded contract by county supervisors at $27,000 for paving approximately two miles of San Marcos pass road with oiled macad. Chas. T. Richardson bid $32,000. Owen H. O'Neill, county surveyor.

Colo., Denver—Two contracts for state highway work totalling $66,000, have been awarded by the highway department. The first contract is for a gravel surfacing project on the Santa Fe trail, between Lamar and the Prowers county line. It is 7 miles in length and the contract was awarded to the Standard Engineering and Construction company of Denver, for $42,000.

Ore., Oregon City—The State Highway Commission has awarded the road contract for the section of the Pacific Highway between Fifth street in Oregon City and Canemah, approximately .9 mile in length, to Rajotte-Winters, Inc. The total amount of the contract is $90,000 and the date set for completion is Dec. 31, 1923. Under the terms of the agreement which has just been executed Oregon City, Portland Railway Light and Power Company, Crown Willamette Paper company and the Southern Pacific Company are cooperating in varying amounts.

Ore., Astoria—McClean & Williams were the lowest bidders on the paving of about 1 mile of the market road between the McGregor ranch and Youngs river falls and the contract will be awarded to them. The paving is to be of 6½-in. concrete and 15 ft. in width. Price, $20,495.03, contract to be completed by Aug. 15.

Wash., Olympia—Awards have been made for two highway jobs as follows. Grading, draining and paving with concrete about 6.37 miles of the Pacific Highway between Carrolls and Kelso to S. A. Moceri & Co., Seattle, for $221,417. Similar work on 4.4 miles of the Pacific Highway between Kalama and Carrols awarded to F. X. McLellan of Seattle for $155,865. Specifications call for 6-in., 20 ft. concrete for both jobs.

Wash., Everett—Snohomish County Commissioners have granted a petition of Mukilteo residents for the paving of 2.8 miles of the Mukilteo Road, under the Donahue Road act. County Engineer Ross D. Alverson places the estimated cost at $75,200 for six-inch concrete paving, 16 ft. wide. Plans for the road will be started at once.

Irrigation Projects

Calif., Sacramento — A contract has been awarded by the State Reclamation Board for construction of approximately 13 miles of levee work in Reclamation District No. 1660, Sutter County, to W. E. Callahan Co. of Texas. The cost will be approximately $1,000,000.

Calif., Bakersfield—The project to store the waters of Kern River behind an artificial barrier in the mountains near South Fork will proceed without further hindrance according to Herman T. Miller, chairman of the committee of 25 which has presented a petition for the formation of an irrigation district to include 292,100 acres in Kern County. The cost of building the dam in the mountains and the necessary canal system would approximate $25,000,000, it is said. According to the chairman of the committee of 25 it is probable that an election to determine whether bonds shall be issued for that amount will be called in the near future.

Nev., Fallon—Signing of the agreement whereby the reclamation service leases the Lahontan power plant for ten years to the Canyon Power Company, clears the way for construction of the Spanish Springs reservoir. This was the assertion of John F. Richardson, manager of the Newlands Project in commenting on the signing of the agreement by Secretary of the Interior Fall. "It means the completion of the largest irrigation project in the west, and reclamation of lands for which people on the lower Truckee and the bench lands of the Newlands Project have waited twenty years," Richardson states. Approximately $200,000 is available for work to be completed or contracted for by July 1st; he has left for Denver to consult with F. F. Weymouth, chief engineer, to plan details for the first work on the Spanish Springs system.

Ore., Portland — The North Canal Company has applied for permission to construct Crane Prairie reservoir for the storage of 160,000 acre-feet of water. The reservoir will be placed in the channel of the west fork of the Deschutes River. The dam is to be of loose rock, with timber facing resting on a hand made rubble masonry wall. The wasteway will be of cyclopean masonry and the outlet will be a concrete lined tunnel 9 ft. square controlled by iron gates operated by lifting devices. The total area submerged will be 7,750 acres. The water will be used for irrigation, power and domestic purposes, with a priority date of Sept. 9, 1921. The total cost of this project is estimated at $160,000.

Ore., Pendleton—Contracts are expected to be signed between the U. S. Reclamation service, the Western Land and Irrigation company, and the Furnish company for additional water to be taken from the McKay Creek dam soon to be constructed in Umatilla county. F. E. Weymouth, chief engineer of the reclamation service, from Washington, D. C., is now in Hermiston, the irrigation center for Umatilla county, making preliminary arrangements for the construction of the $2,000,000 storage project on McKay Creek.

Power Plant Equipment

Calif., Venice—Southern California Edison Co. will expend approximately $408,000 during 1923 for improvements to its system in the Venice district. Of this, $270,000 will be expended on power lines from the Sierra power plants and $138,000 for actual work in the Venice territory. The new work will provide for 2500 additional houses, 5 new factories, and an increase of 12,000 in population.

Calif., Santa Barbara—Southern California Edison Co. will expend approximately $81,000 for extension of its lines in Santa Barbara in 1923. A substation is planned at Carpinteria costing $60,000, and renewals in this district will amount to $22,500. A total of $241,000 has been appropriated for Santa Barbara and vicinity.

Calif., Monrovia—Southern California Edison Co. will expend approximately $156,000 on improvements to its lines and service in this district. This territory is served by the high Sierras power plants, for which about $12,000,0000 has been appropriated.

Calif., Fullerton—Southern California Edison Co. has appropriated about $300,000 to be expended on improvements and betterments in the Fullerton, La Habra, Brea, Placentia and Yorba Linda district.

Calif., Los Angeles—G. H. Kuhrts, General Manager of the Los Angeles Railway Company stated that a new power substation will be built at 54th & 2nd Ave. Station and equipment will cost $125,000.

Power Projects

Calif., San Bernardino—San Gorgonio Power Co. has secured a loan of $450,000 for the construction of two hydroelectric plants north of Banning and Beaumont. About $18,000 will be expended on new roads into the territory. R. R. Scarborough is president, and M. T. McAllister, secretary.

Calif., Modesto—Bids will be received April 9 on $298,400 Modesto Irrigation district bonds for construction of transmission lines from Don Pedro dam to the Modesto district.

Wash., Okanogan—The Washington Water Power Company will immediately put crews in the field to start the extension of the 60,000-volt transmission line from Okanogan to Withrow.

Railways

Calif., Los Angeles — Los Angeles Railway Corp., 11th and Broadway, is preparing plans for an automatic power station to be erected at 54th Street and 2nd Ave. The building will

be 46 x 40 ft., brick construction with plaster exterior, structural steel, concrete roof. Ice-box doors will be used to eliminate noise. There will be no windows. Bids will be taken in about 30 days. Plans have been completed for a brick administration building to be erected by contract at 7th and Central. It will be 1-story, 28 x 280 ft., brick construction composition roof, cement floors, steel sash, wire glass. Bids will be taken in about a month.

Calif., Kelso—W. A. Bechtel, San Francisco, has been awarded general contract by Union Pacific Railway, at $17,500 for construction of a pre-cast unit type reinforced concrete roundhouse, 10 ft. long, at Kelso, San Bernardino county. It will contain five stalls. Other construction work at Kelso totals approximately $100,000.

Calif., Bakersfield—A. T. & S. F. Ry. will expend about $5,000,000 eventually on terminal facilities for Bakersfield. Immediate plans involve the construction of a building to house about 20 engines, and a storehouse for heavy material. It is proposed to double track the road from Bakersfield to Kern Junction. J. W. Walker is superintendent of the Valley division.

Calif., Bakersfield—Southern Pacific Railway has applied to the interstate commerce commission for permission to construct a branch line railroad between Magunden and Arvin, Kern County. It will be 19 miles long and will serve the Weed-Arvin district.

Ore., Portland—Hawthorne Avenue from Grand Ave. to East 11th street is to have new rails laid for heavy trolley traffic, and to prepare the way for the new roadbed temporary tracks have been laid on each side of the avenue to take care of the present car traffic construction crews. Vice-president Fuller of the Portland Railway Light and Power Company states that the new rail construction will cost about $40,000 and the rails used will be the heaviest used of any trolley car rail in the city, 122 lb. to the yard. The actual construction work will be completed in 30 days, but a city ordinance provides that the cement work used under the track must be left for 30 days to harden. Thus the new tracks will not be used for two months.

Wash., Spokane—The Great Northern Railway, at an expense of $543,262, has begun relaying its tracks between Wilson Creek and Quincy, a distance of 35 miles, with 100-lb. rails. According to F. S. Elliott, western superintendent, the company will spend in the Spokane Division this spring, more than $1,000,000; the automatic block signal system between Fort George Wright and Wenatchee will cost $400,000, and $60,000 will be spend in rebuilding telephone lines.

Wyo., Casper—A $12,000,000-dollar contract for the construction of 330 miles of railroad from this city to Miles City, Mont., via Sheridan, Wyo., has been let to the firm of Peterson, Shirley, and Gunther with headquarters at Omaha. Involved in the contract is the building of a telegraph system and fencing for the entire distance.

Street Lighting

Calif., Los Angeles—Osborn Electric Co., Turlock, submitted low bid to board of public works, at $7,230 for constructing ornamental lighting system in Seventh Street between Pacific Avenue, and Gaffey Street.

Calif., Los Angeles—C. W. Sparks, 433 San Fernando Building, Los Angeles, submitted low bid to board of public works, at $7,295 for constructing ornamental lighting system in Sixth Street between Pacific Avenue and Gaffey Street San Pedro.

Colo., Calhan—The installation of a municipal lighting system will be made if the recently introduced city ordinance is approved at the election May 3. Action will also be taken on a waterworks system, if the bonds are authorized.

Streets and Sewers

Calif., Napa—R. E. Errington has been awarded contract by the city council for the paving of Third Street from School to Jefferson, a distance of four blocks, price $21,051.

Calif., San Bernardino—J. F. Knapp of Turlock, (Box 442, Long Beach) was awarded contract by county supervisors at $109,600 for improving Hellman Avenue, approximately one mile, by grading and paving with 5-in. concrete pavement; constructing curbs, walks, and retaining walls.

Ore., Portland—City Engineer Laurgaard has been directed by the council to prepare plans and specifications for the improvement of Caples street from its southerly end to Broadway drive; Wygant street from East 7th Street to East 11th Street; East 46th SE from 60th Avenue SE to 48th Avenue SE; East 27th Street from Siskiyou to Klickitat Street; and for a sewer in East 27th Street from Siskiyou to Klickitat Street.

Ore., Portland—A. D. Kern was the lowest bidder for the paving of Flanders street from First to Twelfth streets, his price being $54,471 for asphaltic concrete. The Jacobsen—Jensen company submitted the lowest bid, amounting to $14,189.80, for the construction of the Forty-second Street Southeast and the Seventy-second Avenue Southeast sewer system.

Utah, Ogden—William E. Roche has been awarded contracts for $142,898.83 worth of sewer work in the Third ward by the board of city commissioners. The contracts call for cement-concrete pipe in districts 148 and 149, on which Roche was the lowest bidder. The bid on district 148, which extends from Sixth Street to Second Street, between the east and west lines of the city, was $68,663.05; that on district 149, extending from Sixth Street to Twelfth Street, was $74,235.78.

Wash., Seattle—City Engineering Department has completed plans and is calling for bids for the Beach Hill Improvement project, which completed will cost $1,500,000. The work will be awarded in two separate projects: the first to include sluicing of 1,496,000 cu. yd. of earth from the hill to the 9th Avenue South district; the second the paving of 23,050 sq. yd. of 8th Avenue South with 8-in. concrete.

Wash., Seattle—Two important projects to be undertaken in Seattle during the summer include the paving of Jackson Street, et al., at an estimated cost of $543,261; and paving of Wilson Avenue, et al., at an estimated cost of $253,353.

Waterworks

Calif., Chico—At a special meeting of the city trustees it was decided to again place the water bond proposition before the voters at an election to be held in April.

Calif., Santa Barbara—The $850,000 bond issue for a water supply and distributing system for Montecito county water district carried at the special election March 1. The proposed plan is to construct a tunnel through Toro Canyon at a cost of $350,000 to secure a seepage flow sufficient for present needs, and to build a distributing system costing $500,000. Cook, Wyant & Moore, consulting engineers, prepared the preliminary report for the district.

Idaho, Lewiston—The municipal water system is to be improved and extended by the Burns & McDonald Engineering company of Kansas City, Mo., and will cost $380,000. Two reservoirs will be installed. The improvement will also include a filtration plant. All wooden pipe will be replaced by cast iron.

Miscellaneous

Calif., Eureka—The Sugar Loaf Peak tunnel of the Electro-Metals Company at Ishi Pishi Falls of the Klamath River in Siskiyou county, near Sommer Bar, is practically completed. The tunnel will, after the construction of the dam, be used as a penstock for a power plant to develop 110,000 hp. A standard gage railway will be built, it is expected, over the 50 miles from Trinidad to the site of the power plant. The plant will manufacture products of iron, copper, zinc, and other metals, the ore and supplies coming by sea.

Colo., Denver—An entirely new fire alarm system with headquarters in a three-story central fire station to be built at Twelfth and Curtis Streets, the total cost of which is estimated at $200,000, is planned for submission to the voters at the coming city election asking authority for the issuance of bonds to finance the improvements.

Wash., Seattle—The Inter-County Rivers Commission of King and Pierce Counties plans the expenditure of approximately $120,000 in control work along the Stuck and White Rivers. King County will pay $72,000.

Wash., Wenatchee—The Farmers' Telephone & Telegraph Company will make extensions, repairs and improvements costing from $30,000 to $40,000.

Buildings (Industrial)

Calif., Los Angeles—Los Angeles Gas & Electric Corp., 645 So. Hill Street, will erect a 1-story storage building for itself at S. E. corner 48th and Staunton Avenue. Dimensions, 313 x 90 ft., steel frame construction, corrugated iron exterior and roofing, cement floors; $60,000.

Calif., Los Angeles—Hamm & Grant, Inc., industrial engineers, Ferguson Building, have been commissioned to prepare plans and will erect a worsted and woolen mill on Central Avenue near Ballona Avenue for the Pioneer-Pacific Worsted Co., Lemuel J. Coburn, president. The first unit will cover an area of 125,000 sq. ft. and will be 1-story, steel frame construction, brick and hollow tile walls, steel sash, wire glass, saw tooth roof, probably factory maple floors; $250,000.

Calif., San Jose—Work is to be started within a few weeks on a $2,500,000 cement manufacturing plant, to be the largest of its kind in the country, which will be built by the Guadalupe Lime & Cement Co. on the Almaden road about ten miles southwest of this city, it was announced recently.

Calif., Compton—W. H. Edwards will erect a $30,000 ice plant on Terebinth Street, opposite the Samson Tire Factory.

Mont., Shelby—The Red Cliff Brick Company of Medicine Hat, Alberta, is planning to locate a plant in Shelby costing $60,000.

Wash., Aberdeen—A $50,000 veneer plant is to be built on the site of the Panama and Eastern Mill on the Hoquiam River, as announced by A. A. Bator, of Aberdeen, A. G. Basil and A. J. DeLateur of Raymond, and L. P. Cole of Olympia. The plant will be known as the Grays Harbor Veneer Company. Construction of the new plant will start at once.

Wash., Spokane—The American Smelter & Refining Company will spend $200,000 in increasing the capacity of its smelter in East Helena. Increased ore receipts due to a contract with the Hercules and Tamarack & Custer mines in the Coeur d'Alenes makes this enlargement necessary.

Wash., Tacoma—A new factory costing $75,000, to employ 300, is planned for Tacoma by the Rice-Greisen Company of San Francisco, according to officials visiting in Tacoma, inspecting sites.

Wash., Chelan—Construction work will begin soon on a $375,000 cold storage and ice manufacturing plant. The cold storage plant will be capable of storing 300,000 boxes of apples and the ice plant manufacturing 50 tons daily, with a storage capacity of 4,000 tons. The plant is to be built by R. H. Moorhead of Chelan.

Buildings (Miscellaneous)

Calif., Woodland—School—Goold & Johns, of Stockton, have been awarded the contract for construction of the Esparto Union High School on their bid of $86,387.

Calif., Los Angeles—School—Pozzo Construction Co., 421 Macy Street, was low bidder at $111,110 on the general contract of erecting a new building at Laurel school site. Thos. Franklin Power, 307 Tajo Building, architect.

Calif., Los Angeles — Theater — Architect G. Albert Lansburgh, Los Angeles and San Francisco, Calif., has completed plans for a 3-story theater building to be erected on west side of Highland Avenue, north of the Hollywood Hotel, for a group of local capitalists and theatrical men who have organized a stock company. John M. Bowen, Van Nuys Building, attorney, represents the new corporation, the personnel of which is withheld. The structure will contain an auditorium seating 1,500, with offices for the company, etc. The building will be of Spanish type with reinforced concrete exterior walls, tile roof. Estimated cost, $750,000.

Calif., Santa Barbara—Theater—E. L. Mayberry, 472 Pacific Electric Building, has been commissioned to prepare engineering plans for the new Lobero theater to be erected at Santa Barbara for a syndicate of Santa Barbara and Montecito men. It will cost $125,000. It will be reinforced concrete and tile construction and will be built by Geo. W. Smith, Santa Barbara, architect.

Calif., Los Angeles—School—The architectural department of the board of education, Edgar H. Cline, architect, has completed plans for the new Wilshire junior high school buildings to be erected on McCadden Place, between Wilshire Blvd. and Sixth Street. There will be two buildings, each 2-story, 120 x 350 ft. and 64 x 145 ft. respectively. Brick construction, tile and composition roofing; $350,000. The board of education will advertise for bids shortly.

Calif., Los Angeles—W. F. Riley, 3706 Whittier Blvd., has the contract at about $115,000 for the erection of a 3-story, class C apartment building at 475 South Bixel Street for F. W. Babcock; will contain 51 rooms, divided into single apartments. Brick, 3-story and basement, 97 x 100 ft., pressed brick facing, composition roofing, tile baths and drainboards, O. P. and hardwood floors, gas radiator heating, automatic unit storage water heater, wall beds, automatic electric passenger elevator, garbage incinerator, ornamental iron, maple floor in hall room, staff work. Plans by Architect Edward Cray Taylor, and Ellis Wing Taylor, engineer, 713 West 8th Street.

Calif., Oakland—Offices—Contracts have been signed for the erection of a 3-story reinforced concrete building on the east side of Franklin Street, just north of Fifteenth. The investment will be $125,000.

Calif., San Francisco—Apartments—Tentative plans for a 12-story apartment building, to cost approximately $2,000,000, have been announced by John C. Shipp, president of the Sierra Securities, Inc., and associates, to be erected on the southeast corner of California and Mason Sts., running through to Pine St. B. G. McDougall is the architect. The property was recently purchased from the University of California and possession will be had about July 1. Permission has been granted by the city engineer to tunnel under California Street to connect the apartments with the Fairmont Hotel. Under the apartments it is planned to have three stories below the California Street level, to be used as a garage. Plans for financing are well under way, according to Mr. Shipp, and may take the form of a bond issue.

Calif., Sawtelle — Institution — Los Angeles Building & Contracting Co., Marsh-Strong Building, has been awarded the contract at $190,444 for all work complete for erecting an administration and hospital building at Soldiers' Home, Sawtelle. The building is to be completed by June 30.

Calif., Sacramento—Hotel — Within the next 90 days work will be started on a ten-story, 400-room hotel here. The investment will total about $2,000,000. The building will be financed by a group of San Francisco and Sacramento men, headed by E. Tripp and W. C. Crittenden, of San Francisco. The structure will occupy the corner of 12th and L Streets, with a frontage of 200 ft. on L Street.

Calif., Long Beach—Apartments—F. H. Butterfield, 464 Cerritos Street, Long Beach, has had plans prepared and will erect a 144-room apartment building at 323 W. Fourth Street, Long Beach, for himself; $150,000.

Calif., Los Angeles—Offices—Architects Morgan, Walls & Morgan, 1124 Van Nuys Building, have completed plans and are taking bids for erecting a 5-story, class A building on East First Street, near Alameda Street, for the Los Angeles Soap Co. It will be a combination office and warehouse building, 60 x 270 ft., reinforced concrete construction, steel sash, steel rolling doors, elevators, etc.

Calif., Los Angeles—Offices—C. J. Kubach Co., 701 Merchants National Bank Building, was low bidder on the general contract at $1,370,000 for erecting the new Chamber of Commerce Building on 12th Street, extending from Hill Street to Broadway; John C. Austin, 1125 Baker-Detwiler Building, and John Parkinson, 420 Title Insurance Building, associated architects. The Kubach Co. also submitted a general bid including all work completed, except elevators, at $2,169,000.

Calif., Pasadena—School — Architects Allison & Allison, 1405 Hibernian Building, are preparing plans for the George Washington school on Monk Hill, Pasadena. There will be an auditorium, study hall, class rooms, cafeteria and manual training department, brick construction; $200,000.

Colo., Denver—On the opening of bids for the state university medical school and hospital to be built here, that of Alex Simpson, Jr., was the lowest and amounted to $983,730 for the general construction work while the Denver Electrical Co. was low on electrical work with a bid of $59,500.

Colo., Denver—A recreation building to include a gymnasium, swimming pool, and recreation rooms for the Knights of Columbus, will be started shortly on the property adjoining the present club house at Sixteenth and Grant Streets, at a cost of over $100,000, according to J. Leo Stack, head of the local organization.

Ore., Portland—Apartments—Two new apartment houses are to be erected in the city immediately, planned by Claussen & Claussen. A 4-story building will be erected on the 80 x 100-ft. site adjoining the Cordova Hotel on Eleventh Street for Elizabeth M. Newton, and will cost $105,000. There will be 34 apartments of 2, 3 and 4 rooms. The plans call for a reinforced concrete structure with a faced brick front. The second apartment house is being erected by Frank Cunningham, as planned by the same architects as above, and will occupy a 100 x 100-ft. tract and will contain 20 apartments. The location is Fremont and Michigan Streets and the cost will be $50,000.

Ore., Portland—School—Houghtaling & Dougan, architects, have prepared plans for the new Washington High School building to replace the one recently destroyed by fire. The plans call for a three-story and ground floor, reinforced concrete building, 160 x 180 ft., costing in the neighborhood of $450,000.

Ore., Portland — Apartments — Thomas & Thomas will erect two apartment houses on the north side of Hawthorne Avenue between East 18th and 19th Streets, for the Lawrence-Moore Company. They will each be 85 x 85 ft., two stories and basement, of hollow tile with brick veneer, costing $75,000 each.

Ore., Portland—Stores—Offices — A four-story structure with a frontage of 75 ft. on Alder Street and extending back 130 ft., is to be erected at a cost of $150,000. Plans are being prepared by Houghtaling & Dougan. A sprinkler system will be installed and the interior trim will be mahogany with tile corridors. M. Ungar, owner.

Ore., Astoria—Theater—The Black Cat., Inc., a $60,000 concern, has announced that it will erect a modern theater costing $100,000 in Astoria this spring or summer.

Ore., Portland — Terminal — A new two-story terminal building covering half a block on the south side of Salmon Street between 5th and 6th is to be erected as announced by J. H. Ainscough, president of the States Auto Truck Company. The outlay will be about $250,000. In addition to a commodious stage station with driveway there will be a large number of stores for retail establishments. There will also be a full basement. The structure is to be ready for use in six months. Houghtaling & Dougan are the architects.

Ore., Portland—Lodge—The general contract on the Al Azar temple has been awarded to the William Freeburg Construction Company. The building will be 100 x 100 ft., two stories and basement.

Wash., Vancouver—Institution — The Pythian Home for Oregon and Washington has issued a call for bids. The unit to be erected now is to be the administration unit, containing the administrative offices, auditorium, dining room, hospital and 35 guest rooms. Fireproof, 3 stories and basement, costing about $150,000.

Wash., Wenatchee—Bank—The First National Bank plans to immediately demolish present structure and erect a two-story building, 85 x 45 ft. in size, costing $100,000. Plans under way by Albert Held, Spokane.

Wash., Sedro Wooley—School — Union High District No. 4 has accepted plans of Stephen, Stephen & Brust, architects, Seattle, for the proposed Union High School, to cost $125,000. Structure will have capacity of 700 pupils, with auditorium seating 1,000 persons.

Wash., Sunnyside—School—The King County School District has commissioned F. A. Naramore, architect, Central Building, to prepare plans for a union high school, to be two-story and basement, of brick, costing between $70,000 and $80,000.

Wash., Seattle—Offices — James Campbell of the Campbell Lumber Company plans the erection of an eight-story office structure costing $250,000, as an annex to the Central Building. Only two stories of the building may be erected at this time, at a cost of $85,000, but the owner may proceed with the entire structure.

Wash., Seattle—Offices—W. H. Britt plans the erection at E. 52nd and University Way, of a business and office building, three stories high, costing $100,000. J. R. Nevins, architect.

Wash., Seattle—Apartments — H. Riernersten, 5903 Fremont Avenue, plans the erection at 4910 Brooklyn Avenue of a 3-story apartment building, 80 x 103 ft., containing thirty-three apartments, and costing $80,000. John A. Creutzer, architect.

Wash., Tacoma—School—The Tacoma school board has decided to present to the people of the city at the May election a bond issue of approximately $2,400,000 to provide additional school facilities, including a number of new buildings.

Wash., Seattle—Apartments—Plans for a 3-story modern apartment building to cost approximately $75,000 and to be erected at the southeast corner of Terry Avenue and Jefferson Street, are being prepared by Architect J. A. Creutzer, Leary Building. The building will be the property of John Hopkins. It will be finished with terra cotta and will occupy a ground area of 120 by 52 ft. It will contain thirty-two apartments.